Reflective Functioning in a High-Risk, Prospective, Longitudinal Sample: Early Antecedents and Associations with Adult Attachment Representations

A Dissertation
SUBMITTED TO THE FACULTY OF
UNIVERSITY OF MINNESOTA
BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

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June 2021

Acknowledgments

First, I would like to thank the many people who made the Minnesota Longitudinal Study of Risk and Adaptation possible: Dr. Byron Egeland and Dr. Alan Sroufe, the original pioneers of the project; the families who shared their lives; and the various research associates, graduate students, and trainees who contributed to data collection and analysis over the years. I would also like to thank Monique Nakamura for her assistance in coding for this project. This dissertation was supported by a National Science Foundation Graduate Research Fellowship, a University of Minnesota Doctoral Dissertation Fellowship, and an Institute of Child Development Small Grant.

To my primary advisor during my time at the Institute of Child Development, Dr. Ann Masten, for offering a glance through her eyes into the world of resilience and allowing her students to choose their own path. To my co-advisor, Dr. Glenn Roisman, who graciously supported my desire to explore a topic that inspired me. To my committee members, Dr. Bonnie Klimes-Dougan and Dr. Abigail Gewirtz, for their contributions to my development as a clinical child psychologist.

Thank you to the cohort members and peers who provided me with inspiration, empathy, and joy as we embarked on this arduous journey. Thank you to my family for their unwavering support as I followed my dreams. Thank you to my partner Mikhail Belkin, who has pushed me through struggles and celebrated my triumphs during this entire graduate school journey. I cannot imagine these past several years without you. Finally, I am incredibly thankful to my mother, who instilled my curiosity in the human mind. You are a pillar of strength in the face of adversity and an inspiration for all that I do.

Dedication

To my mother, Desirae.

I love you more than you love me, I love you times infinity, I win.

Abstract

The construct of reflective functioning (RF)—the ability and propensity of an individual to understand interactions between mental states and behaviors in the self and others—emerged as an attempt to answer some of the gaps in the contemporary attachment theory framework. Despite a growing body of research supporting the role of RF as a mediator between one's own childhood attachment experiences and observed parenting behaviors with their child, many questions remain. First, it is unclear what contributes to the development of adult RF. Second, it is unclear whether RF provides unique information compared to other operationalizations of adult attachment mental representations, including security. This dissertation project aimed to examine these questions within a prospective, longitudinal study of adults born into poverty. Results did not support the hypothesis that infant attachment security and observed maternal sensitivity would predict RF at age 26. Unexpectedly, results also indicated that RF was more closely associated with concurrent preoccupied and unresolved attachment states of mind than markers of security. A number of interpretations of these results are considered, including potential experimental error and the issue of construct validity. Overall, this dissertation project contributes to the existing literature on RF and highlights the need to continue to empirically test theoretical hypotheses related to RF and attachment theory using diverse, prospective datasets.

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> In every nursery there are ghosts. They are the visitors from the unremembered past of the parents, the uninvited guests at the christening. Under all favorable circumstances the unfriendly and unbidden spirits are banished from the nursery and return to their subterranean dwelling place…In still other families there may be more troublesome events in the nursery caused by the intruders from the past…the ghosts take up residence and conduct the rehearsal of the family tragedy from a tattered script. (Fraiberg, Adelson, & Shapiro, 1975, pp. 387-388)

Scholars have spent decades trying to understand the processes by which humans develop rich emotional lives and form successful relationships with others. As the above quote suggests, the caregiver-child relationship is full of history and nuance, and provides particularly powerful insights into these processes. Yet how exactly does this relationship shape a child's social and emotional functioning later in life? Such is the heart of attachment theory (Bowlby, 1977), a prevailing theory within the field of developmental psychology. Attachment theory posits that children build expectations of care based on the quality of the caregiver-child attachment relationship. These expectations contribute to the construction of a stable mental representation of the relationship that the child carries forward into later relationships throughout the lifespan, including with their own children in adulthood. Thus, attachment theory proposes a model of intergenerational links between caregiver and child emotional and social functioning.

A large body of research (e.g., Benson, McWey, & Ross, 2006; Groh, Fearon, van IJzendoorn, Bakermans-Kranenburg, & Roisman, 2017) supports attachment theory as a valid explanation of the formation and quality of human relationships over time, yet

many components of attachment theory remain unclear. First, it is not entirely certain how to best operationalize attachment mental representations. Longitudinal studies show that “gold-standard” measures of attachment representations are only weakly associated with an individual’s attachment experiences as an infant (e.g., Groh et al., 2014; Weinfield, Sroufe, & Egeland, 2000). Second, the full picture of the mechanism(s) through which caregivers’ attachment mental representations influence their children’s attachment security is incomplete. Research suggests that attachment security is partially transmitted by sensitive and responsive parenting behaviors, but much of the variance remains unaccounted for (e.g., van IJzendoorn, 1995; Verhage et al., 2018, 2016).

Reflective functioning may serve as a unique piece of this puzzle. Broadly speaking, reflective functioning (RF) represents the ability and propensity of an individual to recognize mental states in the self and others, and understand how actions are guided by said mental states (Sharp & Fonagy, 2008). Rooted in attachment and child psychoanalytic theories, a growing body of research suggests that RF might act as a mediator between one’s childhood attachment experiences and observed parenting behaviors with their child. Nonetheless, several questions remain regarding the role of RF, especially compared to alternative operationalizations of adult attachment mental representations and expanding hypotheses about the intergenerational transmission of attachment experiences (e.g., van IJzendoorn & Bakermans-Kranenburg, 2019). In the ongoing quest to understand how caregiver-child relationships shape individual social-emotional development, this study aims to address some of the lingering questions about the relative significance and development of RF within the attachment theory framework using a high-risk, prospective, longitudinal sample.

Literature Review

Attachment Framework

To better understand the relevance of the construct of RF, it is important to consider the theoretical, methodological, and empirical contexts from which it emerged. Below is a brief review of the history of attachment theory, “gold-standard” methods of operationalizing attachment-related constructs, and the theoretical and empirical gaps left by these operationalizations.

Overview and Origins of Attachment Theory

In 1958, British psychoanalyst John Bowlby critiqued contemporary theories about how caregiver-child relationships yield differences in adult personality. Bowlby combined concepts from several of these theories, including psychoanalysis (e.g., object relations), learning theory (e.g., secondary drives), cognitive theory (e.g., development of self versus other), and ethology (e.g., instincts), to derive what would eventually be known as attachment theory (Bowlby, 1958). Bowlby saw attachment theory as a way to describe the “propensity of human beings to make strong affectional bonds to particular others” (p. 201) during times of loss and/or separation (Bowlby, 1977).

According to attachment theory (Bowlby, 1977), humans have an instinct to gain proximity to others. Infants elicit proximity to caregivers through attachment behaviors such as crying and clinging. Caregivers differ in their responses to these attachment behaviors. Over time, the infant builds expectations of care based on patterns of care-eliciting and caregiving behaviors between them and their caregiver over time, reflective of the quality of the attachment relationship (Main, Kaplan, & Cassidy, 1985). When a caregiver is responsive and available to meet the needs of their infant and protect them from harm, the infant is expected to form a secure attachment to their parent—a conceptualization of the parent as a secure base that offers support and guidance as they explore the world. However, if the caregiver-infant relationship is marked by extended periods of separation, threats, and/or rejection (i.e., lack of responsiveness),

the infant is thought to form an insecure attachment—an expectation that the parent will not offer consistent support and care under conditions of stress or challenge.

These expectations contribute to the construction of a stable mental representation of the relationship, also known as an internal working model. For an infant, the internal working model is a "representational model of himself as being both able to help himself and as worthy of being helped should difficulties arise" (Bowlby, 1977, p. 206). This mental representation is assumed to be relatively stable and thought to guide and organize their subsequent relationship experiences throughout development, including attachment relationships with romantic partners and future children. Secure attachment representations permit infants to develop into secure adults that are self-reliant and trusting of others, thus capable of providing responsive caregiving to their own child (Bowlby, 1977). Conversely, insecure attachment representations tend to prevent infants from forming adaptive relationships due to a lack of trust in others. These individuals struggle to provide consistent, responsive care to their own infant. Overall, Bowlby's attachment theory provides a theoretical explanation for the intergenerational cycle of relational patterns, personality differences, and non-genetic patterns of family mental health.

Attachment Mental Representations

Despite offering a cogent framework to understand the formation and maintenance of human relationships, many questions remained upon the introduction of attachment theory to the field of psychology. One such question was how to operationalize Bowlby's "internal working models," or mental representations. Valid measurement of attachment-related mental representations was necessary to test hypotheses proposed by attachment theory, such as the association between caregiver attachment and infant attachment.

Measurement of Infant Attachment Representation. The now gold-standard method of measuring infant attachment representations came from the work of American-Canadian psychologist Mary Ainsworth, a significant contributor to the attachment framework in her own right. Ainsworth elaborated on Bowlby's work by focusing on cross-cultural processes and naturalistic interactions between mothers and infants. She and her team created the Strange Situation Procedure (SSP), a behavioral paradigm thought to tap into infant's attachment mental representations (Ainsworth, Blehar, Waters, & Wall, 1978). The SSP allows researchers to classify infants' behavior following separations and reunions with their primary caregiver (e.g., avoiding caregiver, seeking comfort, showing signs of inconsolability). Although conducted within an experimental setting, the SSP is meant to capture the infant's more stable representation of their caregiver as a secure base from which to explore the world outside of the laboratory (i.e., at home). The SSP demonstrates moderate cross-cultural validity with significant amounts of intracultural variation (van IJzendoorn & Kroonenberg, 1988). Following the introduction and validation of the SSP, researchers were primed to examine associations between caregiver mental representations, caregiver behavior, and infant attachment.

Development of the Adult Attachment Interview. To test hypotheses regarding caregiver internal working models, researchers also required measures of adult attachment representations. The subsequent contributions of Mary Main and her colleagues towards this goal have revolutionized the field of attachment research. Main conceptualized the internal working model as "a set of conscious and/or un-conscious rules for the organization of information relevant to attachment and for obtaining or limiting access…to information regarding attachment-related experiences, feelings, and ideations" (Main et al., 1985, pp. 66-67). As such, Main and colleagues (1985) sought to

develop a representational measure that highlighted the way in which individuals organize thought, language, attention, and memory within attachment contexts.

Thus emerged the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985). The AAI aims to indirectly tap into the internal working model by asking general questions about the adult's early experiences with caregivers (for example, what they did when they were upset as a child, and whether they ever felt rejected) and how those experiences impacted their development and adult personality. The individual may then be classified as secure or insecure based on their AAI responses. More specifically, AAI attachment security classifications include: "secure-autonomous," "insecure-dismissing," and "insecure-preoccupied." Depending on the classification system used, an additional "unresolved" status is either added to the secure or insecure classifications or coded as its own separate classification (Hesse, 2008). Through their AAI transcripts, secure adults demonstrate a value of attachment relationships, are able to recall specific attachment experiences, and view early experiences as related to adult personality. They also discuss their attachment experiences in a coherent manner, even in contexts of loss, rejection, or abuse (Main et al., 1985). Insecure adults, on the other hand, may dismiss attachment relationships as non-important, idealize caregivers or past experiences, actively resent their caregivers, show incomplete mourning following the death of attachment figure, and/or show incomplete processing of a traumatic event (Main et al., 1985). Initial validation of the AAI showed strong correlations between infant attachment security (as measured by the SSP) and caregiver attachment security when children were 5 years of age (at the representational level as measured by the AAI), suggestive of intergenerational transmission proposed by attachment theory (Main et al., 1985).

Traditional Analysis of the Adult Attachment Interview. Before individuals are classified as into secure/insecure subtypes, transcripts are scored along several

continuous scales (Main et al., 1985) that are meant to provide a more nuanced, bottom-up analysis of the AAI (Hesse, 2008).

Five “experience” scales provide context for the state-of-mind scales, but do not directly contribute to the security classification. These include: inferred loving behavior from mother and father (e.g., emotional availability, expressions of affection, instrumental support, rejection, role-reversal, neglect, and pressure to achieve).

In contrast, the “state-of-mind” scales allow raters to glean valuable, descriptive information about the individual’s attachment state of mind (i.e., their mental representation or internal working model) from the content of the interview. The scales align with Grice’s maxims of cooperative conversation (1975, as described in Hesse, 2008): quality (“be truthful, and have evidence for what you say”), quantity (“Be succinct, and yet complete”), relation (“Be relevant to the topic as presented”), and manner (“Be clear and orderly”). “Coherence of transcript” reflects consistent, clear, relevant, and succinct conversation regarding attachment experiences (i.e., evidence of all 4 maxims). “Coherence of mind” de-emphasizes the linguistic coherence of the interview and instead focuses on the coherence of the narrative (e.g., reasonable explanations for feelings toward caregiver). “Metacognitive monitoring” refers to the individual’s ability to reflect upon their own thinking and recall, and might reflect comments about contradictions, the fallibility of personal memory, and changes or differences in viewpoints among individuals. “Idealization” refers to the discrepancy between inferred negative experiences during childhood and overly positive views of said experiences (e.g., describing either mother or father as “wonderful” in contexts of abuse), which is a violation of the maxim of quality. “Lack of memory” refers to an “insistence upon the inability to recall his or her childhood, especially as this insistence is used to block further queries or discourse” (p. 565, Hesse, 2008), which is a violation of the maxim of quantity. “Derogation” reflects the degree to which individuals view attachment-related

experiences and relationships are invaluable and show open contempt. “Anger” refers to active resentment toward either mother or father, “subtle efforts to enlist interviewer agreement, extensive discussion of surprisingly small recent parental offenses, and extensive use of psychological jargon,” (p. 565, Hesse, 2008), indicative of a violation of the relevance, quantity, and manner maxims. “Passivity” reflects vague, confused, irrelevant, and/or rambling discourse, which is a violation of the maxim of manner. “Fear of loss” reflects the degree to which individuals express an unrealistic and irrational fear that current or future child will die. Finally, “unresolved loss” and “unresolved abuse” refer to dissociative states of mind (e.g., statements that violate time-space relations) and are thought to indicate incomplete mourning of loss or processing of abuse, respectively.

Raters use scale scores and general classification descriptions to place individuals into attachment security categories. Secure-autonomous individuals tend to have high scores on coherence of mind, coherence of transcript, and metacognitive monitoring, as well as low scores on all other scales. Insecure-dismissing individuals tend to have low scores on coherence and high scores on maternal and paternal idealization, derogration, lack of memory, and/or fear of loss. Insecure-preoccupied individuals tend to have low scores on coherence and high scores on mother and father anger and/or passivity. If individuals provide disorganized discourse surrounding prior abuse or loss (i.e., medium to high scores on the unresolved abuse or unresolved loss scales), an “unresolved” status may be added to any of the above classifications (within the three-way system) or placed in a separate classification (within a four-way system). Finally, a “cannot classify” classification is assigned if transcripts equally fit secure and insecure classification and/or have low scores on all state-of-mind scales (Hesse, 1996).

Alternative Analyses of the Adult Attachment Interview. Although transcripts are scored along these continuous scales, the secure-insecure system assumes that

attachment representations are optimally assessed categorically rather than continuously (Haltigan, Roisman, & Haydon, 2014). To better understand what the AAI actually measures and how it functions, Roisman and colleagues (Haltigan et al., 2014; Roisman, Fraley, & Belsky, 2007) employed a series of empirically-based analyses to investigate the latent structure of the AAI. The insights gained from these analyses allow researchers to obtain more accurate information about the quality of an individual's attachment representation and test more nuanced hypotheses about attachment theory.

Principal components analysis revealed equally fitting 2-component and 3-component models (Roisman et al., 2007). The 2-component model reflected one scale used to differentiate secure from dismissing status (i.e., significant loadings from mother idealization, father idealization, coherence of mind, lack of memory, and metacognitive monitoring); and one scale used to identify both preoccupied and unresolved status (i.e., significant loadings from mother anger, father anger, passivity, unresolved abuse, unresolved loss, fear of loss, and derogation). The 3-component model split the preoccupied/unresolved scale into two: one "active, traumatic enmeshment in earlier experiences (i.e., father and mother anger, derogation, and unresolved trauma) and the other a passive, loss-related preoccupation (i.e., unresolved loss, fear of loss, and passivity)" (Haltigan et al., 2014, p. 20).

Subsequent factor analyses in larger samples also supported the 2-factor structure of the AAI described above (Haltigan et al., 2014). Some scales provided limited information about attachment security classifications; coherence of mind cross-loaded on both factors given the requirement that both dismissing and preoccupied must be low on this scale, and many scales failed to load on either factor (fear of loss, derogation, unresolved loss, metacognitive monitoring). According to Haltigan and colleagues (2014), the Main and Goldwyn state-of-mind coding system ultimately measures two components: the internal consistency of the transcript (secure versus

dismissing), and the ability to discuss childhood experiences while regulating emotions ("active or passive preoccupation").

However, it is unclear from factor analysis alone whether the variation captured by these two factors is categorical (as the traditional Main and Goldwyn system would suggest) or continuous. Taxometric analyses revealed that the factor that captures variation in dismissing (i.e., differentiates secure from dismissing individuals) is continuous, whereas it is unclear whether the factor that captures variation in preoccupation is continuous or categorical, as both models fit the data well (Fraley & Roisman, 2014).

These analyses of the Main and Goldwyn state-of-mind coding system highlight the need to (a) remain critical of the information gleaned from attachment-related measures, particularly those that attempt to measure concepts as abstract as adult attachment mental representations and internal working models, like the AAI, and (b) explore alternative conceptualizations.

Empirical Validation of the Attachment Framework

The development and validation of measures examining infant and caregiver attachment security has allowed researchers to empirically test the many hypotheses proposed by attachment theory.

One such hypothesis is that the internal working model (i.e., attachment security and/or state-of-mind) is relatively stable across the lifespan. Longitudinal, prospective studies with normative-risk (i.e., middle class, predominately White) samples have demonstrated mixed levels of within-person agreement between infant attachment security classification and adult attachment security. Studies using smaller samples have found significant levels of within-person agreement (e.g., E. Waters, Merrick, Treboux, Crowell, & Albersheim, 2000). In contrast, analyses using a large (N = 825), nationally representative sample from the Study for Early Child Care and Youth Development

showed that measures of early childhood attachment security were at most weakly associated with attachment security at 18 years (Groh et al., 2014). There is some evidence that within-person longitudinal associations are lower in high-risk samples compared to normative-risk samples, and family-level factors (e.g., stressful life events, presence or absence of maltreatment, changing levels of maternal sensitivity) account for changes in attachment security over time (Booth-LaForce et al., 2014; Weinfield et al., 2000; Weinfield, Whaley, & Egeland, 2004). It is important to note that the sources of discontinuity found in the literature (e.g., changes in maternal sensitivity) are consistent with attachment theory (i.e., individuals who experience changes in sensitive caregiving are expected to modify their expectations of care accordingly).

Another key hypothesis is that a caregiver's attachment representation is associated with their child's attachment representation. A recent meta-analysis (Verhage et al., 2016) demonstrated a 51% to 58% correspondence between caregiver attachment representation and caregiver-child attachment security, depending on the classification system used (r = .31 from autonomous caregiver attachment to secure infant attachment). Effect sizes were stronger for low-risk samples and with biological caregivers.

The Transmission Gap

Amongst her many contributions to attachment theory, Ainsworth proposed that caregiver behavior (i.e., sensitivity) would serve as a major influence on infant attachment security as the observable manifestation of the caregiver's internal working model (Bretherton, 2013). Thus, a substantial body of research is dedicated to examining the role of sensitive parenting as a mediator between caregiver and child attachment representations. In his meta-analysis of the attachment literature at the time, van IJzendoorn (1995) coined the term "transmission gap" to describe the relatively large amount of variance between caregiver attachment (predominately measured by the AAI)

and infant attachment (predominately measured by the SSP) left unaccounted for by measures of sensitive parenting. Updated meta-analyses show similar findings (Verhage et al., 2016). In studies that report all three constructs (caregiver attachment, sensitivity, infant attachment), sensitivity demonstrates modest associations with caregiver attachment and infant attachment (r = .20 and r = .35, respectively). Mediation analyses suggest that sensitivity accounts for 25% of the combined effect size between caregiver attachment and infant attachment (r = .25, r = .18 after partialling out sensitivity). Thus, the transmission gap continues to exist.

Need for Alternatives in the Attachment Framework

What might explain the apparent transmission gap? Some suggest accounting for attachment relationships with multiple caregiver(s) over the lifespan, as well as exploring other aspects of parenting such as scaffolding or autonomy support (Verhage et al., 2016). Not only might researchers look at alternative mediators, but alternative measures of attachment representations as well, particularly for adults/caregivers. Many researchers have critiqued the AAI traditional state-of-mind codes as a measure of the internal working model (e.g., Bretherton, 2005; T. E. A. Waters, Brockmeyer, & Crowell, 2013), contesting that "[t]hey are only indirect indicators of the mechanisms such as conflicting representations, selective processes, and attentional strategies" (p. 318) and "[do] not directly assess the content or structure of attachment representations" (T. E. A. Waters et al., 2013, p. 320). As such, Verhage and colleagues (2016) claimed "other antecedents of child attachment are likely to be of great importance, which should create fresh impetus to efforts to determine the causal influence on infant attachment security beyond those captured by the AAI" (p. 358).

Alternative measures of adult attachment representations might also help to explain the decreased within-person continuity in attachment security observed in longitudinal studies. In other words, perhaps early measures of the attachment

relationship such as SSP attachment security and caregiver sensitivity are more closely related to constructs not currently captured by the traditional Main and Goldwyn state-of-mind coding system of the AAI.

Given the insufficiency of the traditional attachment measurement system to account for theorized associations between infant and adult attachment both over the lifespan and intergenerationally, other attempts have been made to understand alternative operationalizations and mediators of the internal working model. Two of these alternatives— secure base script knowledge (SBSK) and reflective functioning (RF)—are reviewed in the following sections.

Secure Base Script Knowledge

Conceptualization of SBSK

SBSK has many roots in cognitive psychology and memory research (Bretherton, 2005), and is consistent with early conceptualizations of attachment mental representations (Main et al., 1985). More generally, a script is a "form of schema generalized from lived experiences with a recurring class of events" (p. 162, T. E. Waters & Roisman, 2019). In the context of the attachment relationship, individuals are thought to form a script around attachment figures as a secure base. Thus, a secure base script is a cognitive script of events that forms after consistent patterns of attachment experiences. Secure base scripts are thought to be the "building blocks" of attachment-related internal working models (Bretherton, 2005). Core features of secure base scripts are that "they are learned from experience, stable across time and context, and guides for behavior" (p. 162, T. E. Waters & Roisman, 2019).

A secure base script contains the following elements in their temporal-causal sequence: 1. Constructive engagement: caregiver and child are engaged in the environment; 2. Obstacle encountered: something disrupts this engagement; 3. Signal support: child offers a bid for help/support; 4. Signal recognized: the caregiver detects

the bid and offers help/support; 5. Assistance accepted: child accepts the help; 6. Assistance effective: support effectively resolves the disruption; 7. Emotional comfort: caregiver helps to regulate the child's emotions; and 8. Meaningful re-engagement: engagement with the environment continues (T. E. A. Waters et al., 2013; T. E. Waters & Roisman, 2019). Repeated experiences with the elements described above contribute to the formation of a higher-order internal working model that can be relationship-specific (e.g., one with mother and one with father).

SBSK is thought to differ from the information gathered by the Main and Goldwyn (1985) state-of-mind scales in that it only assesses content and does not assess "coherence, clarity, brevity, or any other linguistic marker" (T. E. A. Waters et al., 2013). Additionally, SBSK might be 'closer' to lived attachment experience because it represents an "internalization of the behavioral patterns enacted countless times across the early years of development" (T. E. Waters & Roisman, 2019, p. 165), whereas AAI coherence does not have a clear behavioral analogue.

Measurement of SBSK

One of the primary methods of assessing SBSK is through the Secure Base Scriptedness measure (H. Waters & Rodrigues-Doolabh, 2004). The Secure Base Scriptedness measure is a semi-projective narrative task in which individuals are asked to create storylines based on 12- to 14-word prompt word lists. The lists suggest a prototypical secure base script, but individuals are instructed to use the words in any way they like. Individuals' stories are then rated on their 'scriptedness,' or general adherence to the sequence of secure base events highlighted above.

An adult's SBSK can also be measured from the AAI (T. E. A. Waters & Facompré, 2018). Using the first six questions from the AAI (up to and including what would your caregiver do when you were upset), coders rate the extent to which transcripts contain "(a) explicit or implied expectations that are consistent with the secure

base script (e.g., caregiver availability, responsiveness, or provision of effective comfort) and (b) recall of specific autobiographical memories that follow the secure base script" (T. E. A. Waters, Ruiz, & Roisman, 2017), p. 202).

Empirical Evidence for the Role of SBSK

Within recent years, several studies have tested hypotheses regarding the role of SBSK within an attachment framework, namely that SBSK is predicted by earlier attachment experiences, is related to concurrent attachment security, and predicts subsequent caregiving behaviors.

Adult SBSK and attachment security as an infant. In a large, normative-risk longitudinal sample, Steele and colleagues (2014) demonstrated weak correlations (r = .14, p < .01) between SBSK and the number of times the individual was secure (measured at 15, 24, and 36 months). Notably, the correlation between the two was not stronger than the correlation between number of times secure and AAI state-of-mind scales (R. D. Steele et al., 2014).

Adult SBSK and received caregiving. Research shows that composites of caregiver sensitivity across the first 13 to 15 years of life are moderately correlated with SBSK in large, longitudinal studies of both normative- and high-risk samples (R. D. Steele et al., 2014; T. E. A. Waters et al., 2017)

SBSK and concurrent adult attachment. SBSK is thought to be related to AAI coherence by "(a) helping individuals recognize the sense of the AAI questions, (b) providing retrieval cues to help access early experiences, (c) helping evaluate what kind of information is relevant, and (d) serving as a criterion for judging when enough information has been provided" (T. E. A. Waters et al., 2013, p. 318). Indeed, several studies have demonstrated significant correlations between SBSK and AAI coherence (R. D. Steele et al., 2014; H. Waters & Rodrigues-Doolabh, 2001; T. E. A. Waters, Raby,

Ruiz, Martin, & Roisman, 2018). SBSK is also moderately correlated with AAI security at age 26, but not age 19 (Waters et al., 2017).

SBSK and caregiving behaviors in next generation. SBSK is thought to be related to caregiving behavior by "helping individuals recognize the secure base relevance of situations and social bids, prepare and organize prompt and relevant responses, and appraise their effectiveness" (T. E. A. Waters et al., 2013, p. 318). T. E. A. Waters and colleagues (2018) demonstrated that a caregiver's SBSK significantly predicted their ability to provide sensitive caregiving to their child, as well as their infant's attachment security (secure versus insecure).

Reflective Functioning

In addition to SBSK, reflective functioning (RF) has manifested itself as a worthy target of investigation given its links to other relevant attachment constructs. As RF serves as the primary focus of this study, a thorough review of the construct is provided next.

Early History, Conceptualization, and Theoretical Basis

The concept of RF was developed by child psychoanalysts at the Anna Freud Center and University College London (Peter Fonagy, Miriam Steele, Howard Steele). RF largely originated from work on the London Parent-Child Project, a longitudinal study that aimed to understand the psychoanalytic roots of the attachment relationship (H. Steele & Steele, 2005). The London Parent-Child Project was influential because it was the first study to establish strong longitudinal concordance (75%) between *prenatal* maternal attachment security and infant attachment security, thereby providing specific evidence for caregiver-driven effects on infant attachment (as opposed to maternal attachment security measured postnatally, which could introduce confounding child-driven effects) (Fonagy, Steele, & Steele, 1991). Fonagy and colleagues (1991) suggested that by verbalizing her own attachment experiences, the mother (a) is able to

express feelings without being overwhelmed by them and (b) demonstrates an understanding of motives behind her parents' behavior. Fonagy and colleagues collectively labeled these abilities as "reflective self-function" (Fonagy, Steele, Steele, Moran, & Higgitt, 1991), later renamed "reflective functioning" (Fonagy & Target, 1997).

Since the early 1990s, the construct of RF has undergone several reiterations and modifications. However, there are several common components among the numerous definitions that appear most essential. RF includes an ability and propensity to: (a) treat individuals as psychological agents; (b) understand, attribute, and/or ascribe mental states (thoughts, feelings, intentions, ideas, emotions, needs, desires, beliefs, goals, etc.) to one's self and others; and (c) understand, explain, and anticipate the transactional relationships between unobservable mental states and behavioral/emotional reactions (Asen & Fonagy, 2017; Ensink, 2003; Ensink & Mayes, 2010; Fonagy & Target, 1997; Sharp & Fonagy, 2008). RF is largely thought to be an automatic process that occurs spontaneously and unconsciously in interpersonal interactions (Ensink, 2003).

RF was heavily influenced by Bowlby's model of attachment (Fonagy & Target, 1997). Bowlby claimed that to serve as a secure base for their child and encourage exploration, caregivers needed:

> an intuitive and sympathetic understanding of a child's attachment behaviour and a willingness to meet it and thereby terminate it, and, secondly, recognition that one of the commonest sources of anger is the frustration of a child's desire for love and care, and that anxiety commonly reflects uncertainty whether parents will continue to be available. (Bowlby, 1977, p. 206)

This would require an ability to first identify the child's anger, frustration, desire, and anxiety, then draw links between these mental states and the child's behavior. In other words, a parent would need RF abilities to act as a secure base and provide sensitive

caregiving. Bowlby himself was reportedly encouraged by the growing contemporary literature exploring associations between sensitive parenting, maternal discussions about feelings and intentions, and young children's perspective-taking skills (as cited by Bretherton, 2008).

RF draws heavily from the field of psychoanalysis. In "Ghosts in the Nursery," a seminal book describing clinical case studies of mother psychopathology from psychoanalytic perspectives, Fraiberg and colleagues (1975) found that "ghosts" manifested within the caregiver-child relationship when mothers provided rich details regarding childhood abuse and neglect and identified with their aggressor, but failed to expand upon the "associated affective experience" (p. 419), reflecting a lack of agreement between lived experiences (i.e., behaviors) and mental states. As such, RF is consistent with the psychoanalytic proposal that an inability to draw bidirectional links between mental states and behaviors leads to disruption in the caregiver-child relationship.

RF is also in line with social information processing models and the field of social cognition (Dykas & Cassidy, 2011). Social information processing and social cognition perspectives posit that individuals use mental representations based on prior social experiences to organize new social information. Internal working models do just this—individuals build mental representations of their social experiences within the attachment relationship (i.e., when the infant was distressed, the caregiver responded in a particular way), and this internal working model influences future relationships (i.e., should I expect to be cared for?). Bretherton (2008) noted that "working models may be transmitted from parents to children through behavioral and emotional interactions; and they stress that children are most likely to develop adaptive, revisable attachment working models when parents encourage exploration of the inner world by modeling emotionally open (frank)

verbal communication about relationships" (p. 108). "Emotionally open" communication with a child would require RF abilities.

Thus, internal working models, psychodynamic defenses, and social information processing all come into play when considering the role of RF in the caregiver-child relationship. If a parent experienced distress in their own childhood, then their internal working models might "function to protect the individual from reexperiencing such distress by limiting access to attachment-relevant social information that might activate the attachment system" (p. 23, Dykas & Cassidy, 2011). Thus, a parent with an insecure attachment might try to block out social information related to their psychological pain and not consider the mental states of their child as a psychological defense against their distressing memories. Their internal working model might also contain positive or negative social information biases, thus altering a parent's ability to accurately assess their child's mental states (Dykas & Cassidy, 2011). This would signify low RF. On the other hand, a securely-attached parent would be able to process their child's actions (e.g., crying, screaming, biting) with minimal distress because they would understand that their child is influenced by internal mental states in need of care and attention without engaging in psychological defenses (Fonagy et al., 1991).

The concept of RF has connections to other theories as well. It is very much influenced by Piaget, particularly his application of cognition to child social development and study of topics including decentering, empathy, and perspective-taking (Ensink & Mayes, 2010). RF also falls in line with socio-cultural, Vygostkyian accounts of theory of mind development in that children are thought to develop reflective abilities through interactions with their parents (Ensink & Mayes, 2010). Finally, Fonagy and colleagues were influenced by philosophers of the mind such as Dennett, who thought there were three stances from which to predict human behavior: the physical stance, design stance, and intentional stance (RF represents the intentional stance) (Fonagy & Target, 1997).

Types of RF

The ability and propensity to understand the mental states of others and uncover relationships between mental states and behavior also comprise the construct known as mentalization. RF is considered to be mentalization specifically within the context of attachment relationships (Sharp & Fonagy, 2008). Despite the specific application of RF to attachment relationships, RF and mentalization are often synonymous and frequently interchangeable within the literature (e.g., Camoirano, 2017).

There are two kinds of mentalizing within the context of an attachment relationship: mentalizing about one's own past childhood experiences *with* a caregiver, and mentalizing about one's experiences *as* a caregiver to their child. These two kinds of RF are named general and parental RF, respectively (Camoirano, 2017). The idea of separate reflective functions stemmed from discrepancies between mothers' prenatal mental representation of their childhood attachment experiences (adult attachment security) and the attachment security of their child (e.g., Fonagy, Steele, & Steele, 1991). Fonagy and colleagues (1991) reasoned that some mothers who were classified as having a secure attachment during pregnancy might possess a different "attachment-related state of mind" (p. 902) and display different parenting behaviors once the child is born. Thus, it seemed possible that a mother's ability to understand mental states in her child might be related, but separate from, a general ability to do so in herself and others outside of that relationship. This is also consistent with Bowlby's attachment theory in that the cognitive models and biases people use to process a particular type of social information are thought to be different from, but related to, those used to process other types of social information (e.g., in relationships with child versus romantic partner) (Dykas & Cassidy, 2011).

In addition to the distinction between general and parental RF, there are number of other meaningful ways of classifying and conceptualizing RF. RF is thought to have

both stable and context-dependent aspects (i.e., trait versus state RF); for example, a parent's ability to mentalize about their mother might differ from their ability to do so with their father (Asen & Fonagy, 2017). Thus, there may be variability in RF across contexts. Additionally, RF can manifest explicitly in verbal interactions with others, or can manifest implicitly through embodied mentalization (e.g., when parents read their infant's behavior, infer mental states, and adjust physically to them) (Ensink, Leroux, Normandin, Biberdzic, & Fonagy, 2017; Shai & Belsky, 2011).

Measurement of RF

As noted previously, RF is an automatic process that occurs spontaneously and unconsciously in interpersonal interactions. Similar to adult attachment security, RF is primarily measured by coding interviews about adults' attachment experiences. RF was first studied using the Adult Attachment Interview (Fonagy et al., 1991). Interview questions such as "Why do you think your parents behaved the way they did?" attempt to uncover adults' awareness of how their parents' mental states affected their behavior and how their parents' behavior affected their own mental states. An ability to do this within the context of the AAI reflects high RF (Sharp & Fonagy, 2008). Fonagy and colleagues (1991, 1998) developed the Reflective Functioning Scale to measure RF within the Adult Attachment Interview. The Reflective Functioning Scale uses an 11-point scale to assess RF. Low levels of RF represent an inability and/or unwillingness to reflect on other's intentions (e.g., broad statements like "grass was greener on the other side" without specific applications to their own life), whereas high levels of RF represent a well-developed ability to understand others' intentions (e.g., differentiating between the mental functioning of a child versus adult) (Sharp & Fonagy, 2008).

The Reflective Functioning Scale has been adapted for use in other attachment-based interviews (see Camoirano, 2017 for a review). The Parent Development Interview (Slade, Grienenberger, Bernbach, Levy, & Locker, 2005) is a 45-item semi-

structured clinical interview that uses many similar questions to the AAI, but focuses on the parent's relationship with their child. Factor analyses of RF within the PDI have revealed a two-factor structure comprising of self-mentalization and child-mentalization (i.e., mentalization focused on the self and the child, respectively), which supports a differentiation between general and parental RF (Borelli, St. John, Cho, & Suchman, 2016; Suchman, DeCoste, Leigh, & Borelli, 2010).

Yet other interviews have been used to assess RF in children. For example, the Child Reflective Functioning Scale was created for use with the Child Attachment Interview (Ensink et al., 2015). Additionally, child RF has been measured using the Friends and Family Interview with 9- to 16-year-olds (Kriss, Steele, & Steele, 2012).

Although interviews have largely served as the primary method to assess attachment mental representations in verbal individuals, other methods are being explored. For example, the 18-item Parental Reflective Functioning Questionnaire has demonstrated initial construct validity (Luyten, Mayes, Nijssens, & Fonagy, 2017). In an attempt to more directly assess RF within caregiver-child interactions, Ensink and colleagues (2017) have created the Reflective Parenting Assessment for use with school-aged children measuring three dimensions of RF: interest in the subjective experience of the child, affective communication (i.e., emotion labeling, causal talk), and capacity to play (i.e., amount of pretend play).

Discriminant Validity of RF

As noted previously, the construct of RF is similar to or even inspired by other existing constructs within developmental psychology (i.e., mentalization). Some have wondered whether RF is too broad or too specific a concept (Ensink, 2003). In order to consider the unique contribution of RF to the literature, it is important to explicitly outline how RF differs from related concepts.

Intelligence. Neither general nor parental RF is considered to be strongly related to intelligence (Ensink, 2003). This mirrors the literature on adult attachment security, which is only weakly correlated with general intelligence (van IJzendoorn, Dijkstra, & Bus, 1995). Empirical findings demonstrate moderate correlations with measures of general intelligence. For example, Fonagy and colleagues found that general adult RF was positively correlated with intelligence (r = .33) (Fonagy et al., 1998). In a more recent study, moderate positive correlations were found between parental RF and total IQ (r = .44), verbal IQ (r = .41), and non-verbal IQ (r = .33) in mothers with substance use disorders (Håkansson, Söderström, Watten, & Skårderud, 2017).

Theory of Mind and Emotion Understanding. The similarities between theory of mind, emotion understanding, and RF are quite apparent, as all three require an ability to take the perspective of another individual. Theory of mind and emotion understanding are considered “constructs of socio-cognitive mentalization” (p. 234, Ensink, 2003) that served as partial inspiration for RF (Sharp & Fonagy, 2008). Both are often used as measures of mentalization, especially before methods of measuring RF were established (Ensink, 2003). Fonagy and colleagues (1991) saw metacognition and theory of mind as cognitive aspects of awareness of mental processes in the self and others. However, whereas theory of mind refers to the simple knowledge of other minds, RF is thought to incorporate an emotional component (i.e., how does someone feel) regarding others' minds (Fonagy & Target, 1997). Within Baron-Cohen’s model of lower level and higher level theory of mind skills, false-belief tasks fall under lower level skills, whereas mentalizing (as conceptualized by Fonagy and colleagues) falls under higher level skills (Ensink & Mayes, 2010). Empirical evidence suggests that RF was moderately correlated with vignette measures of theory of mind and emotion understanding in older children aged 8 to 11 years (Ensink, 2003).

Executive Functioning. Executive functions have been consistently linked to child theory of mind (e.g., Carlson & Moses, 2001). In order to take someone else's perspective in a particular situation, one must inhibit the urge to identify with their own perspective. Thus, it would be expected that RF would be related to and perhaps dependent on executive functions. Preliminary evidence suggests mixed relationships between parental RF and executive functioning. In a normative-risk community sample of mothers with small children, there was no significant correlation between mentalization and executive functioning (Turner, Wittkowski, & Hare, 2008). In a community sample, self-reported interest and curiosity in child mental states was associated with working memory (*r*s = .28 - .42) and set-shifting (*r* = .39) (Rutherford et al., 2018). In a Norwegian sample of mothers with substance use disorders, parental RF was significantly correlated with working memory (*r* = .74), planning (*r* = .63), cognitive flexibility (*r* = .58), and inhibition (*r* = .42) (Håkansson et al., 2017).

Empathy. The links between empathy and mentalization have been debated, and no clear conclusion has been reached (Ensink & Mayes, 2010). Social neuroscientists have argued that a difference lies in the idea that empathy is a voluntarily, motivated behavior, whereas RF and mentalization represent more implicit propensities to attend to others' mental states. However, they both likely stem from the same neurobiological and social processes of observing actions and distinguishing self from other (Ensink & Mayes, 2010). Eisenberg's model of prosocial behavior might shed some light on the difference between empathy and RF. According to Eisenberg's model, empathy is the act of experiencing an emotional reaction similar to that of another person (e.g., becoming sad when recognizing that someone else is sad). Empathy can either lead to sympathy (an emotional or behavioral reaction that is other-oriented) or personal distress (a self-oriented reaction to the other person's emotional state) (Eisenberg et al., 1988). Parents with low RF may very well be more likely to experience

personal distress when interacting with their child, perhaps as a psychological defense against their negative attachment experiences as a child. Parents with high RF are more likely to understand the transactional links between emotional states and behavior, and might act in a way to change their child's negative emotional state. As such, empathy and sympathy focus more on the emotional experience of the parent and its effects on parent behavior, while RF focuses more on the cognitive ability to recognize their child's emotions in the first place. Whether empathy facilitates RF or vice versa is unclear.

Emotional Climate. Parents' ability and propensity to recognize child mental states is thought to foster an understanding of their child that reduces negative reactions to behavior. Thus, it is conceivable that parental RF might affect the emotional climate of a family (e.g., reducing negativity). In their development of an observational measure of parental RF with school-aged children, Ensink and colleagues (2017) performed a factor analysis of their observational coding scheme and found three factors: RF, affection, and negative parenting. Although RF is thought to underlie emotional climate, and was strongly correlated with the latent factor of observed affection toward the child (r = .63), factor analyses demonstrate that they are distinct facets of parenting.

Mental State Talk/Preoccupation with Mental States. Early studies of RF used mental state talk as a proxy for RF before validated scales were created and published. For example, Fonagy and colleagues (Fonagy et al., 1991) calculated mothers' frequency of references to mental states during the Adult Attachment Interview and related it to infant attachment security. However, RF is not a simple preoccupation with mental states. RF is also meant to capture the desire to understand how mental states accurately underlie behavior. Thus a preoccupied mother might make extensive use of mental state talk, but might not necessarily be able to accurately understand the mental states and behaviors of her child (Camoirano, 2017).

Introspection. A preoccupation with mental states might also be operationalized as introspection or psychological-mindedness. Clearly, a parent with high RF will likely be introspective and psychologically-minded, attempting to recognize and understand their own mental states and their effects on their child. However, Fonagy and colleagues (1991) viewed the concept of psychological-mindedness as vague and thought that RF could fill the gap in its operationalization. Likewise, Fonagy and Target (1997) viewed RF as an expansion of introspection: "the weakness of introspection is to define mental states in terms of conscious motivation rather than, as here, in terms of their capacity to regulate behavior (Fonagy & Target, 1997, p. 681). Thus, Fonagy and Target saw introspection solely as a conscious attempt to understand one's own motives, rather than an implicit and automatic process used in everyday human interactions with others, which RF attempts to capture.

Mind-Mindedness. The construct of "mindedness" has evolved over time. Meins and colleagues have defined "mind-mindedness" as the tendency of parents to treat their children as individuals with full minds, not simply individuals with motivations and intentions (Meins, Fernyhough, Russell, & Clark-Carter, 2001; Sharp & Fonagy, 2008). Mind-mindedness also aims to bridge attachment intergenerational transmission gap from a more cognitive and Vygotskian perspective, operationalizing mind-mindedness as the use of mental state language and instructions/comments within the child's zone of proximal development during semi-structured interviews or free play (Meins et al., 2001). Similar to RF, mind-mindedness is thought to foster child social-cognitive development (e.g., theory of mind). Sharp and Fonagy (2008) comment that mind-mindedness and RF might share common underlying neurobiological bases, but they consider mind-mindedness to be an online measure of the offline metacognitive ability to mentalize. Another major difference between RF and mind-mindedness is that RF also includes parents' abilities to link children's mental states to their behavior, whereas mind-

mindedness emphasizes parents' abilities to simply be aware of their children's mental states (Dykas, Ehrlich, & Cassidy, 2011). Empirically, parental RF was significantly correlated with parents' mind-minded comments toward their 7-month-old infants (r = .39), and RF predicted the frequency of mind-minded comments over and above education level and depressive symptoms (Rosenblum, McDonough, Sameroff, & Muzik, 2008).

Parental meta-emotion philosophy. Other constructs have been conceptualized by family researchers to understand links between parenting and child socio-emotional development. Coming from the field of marriage and family therapy, parent meta-emotion philosophy refers to an organized set of beliefs and attitudes towards one's own emotions and one's children's emotions (Gottman, Katz, & Hooven, 1996). A parent meta-emotion philosophy characterized by an awareness of low intensity emotions, viewing negative emotion as an opportunity for teaching, validation of emotions, and frequent emotion labeling and problem solving—named "emotion coaching"—has been found to associated with child emotion regulation abilities (Gottman et al., 1996). Sharp and Fonagy (2008) propose that RF, mind-mindedness, and parental meta-emotion philosophy are similar in that they "refer to a meeting of the mind between parent and child" (p. 748), require an awareness of their own and their child's emotions, and involve metacognitive and meta-emotion processes. All are also seen as mechanisms though which parenting influences child social-cognitive development and emotion regulation. Parent meta-emotion philosophy is perhaps more specialized, as it specifically focuses on emotions as opposed to other mental states (beliefs, desires, wants, etc.). Additionally, whereas RF is considered an ability and propensity to consider mental states, parent meta-emotion philosophy is considered a belief system, imbued with implicit or explicit values about emotions. It would be hypothesized that high parental RF would be associated with higher levels of awareness

of low intensity emotions, validation, teaching about the links between emotions and behavior, and emotion labeling, as characterized by an "emotion coaching" meta-emotion philosophy. To date, no association between RF and parent meta-emotion philosophy has been reported.

Development of RF

RF is considered a major accomplishment within early childhood emotional development (Fonagy et al., 1991; Fonagy & Target, 1997). RF functions on a non-binary scale; one does not either have RF or not, but rather it is a continuous ability (Ensink, 2003). As with any developmental process, RF is influenced by both biological and environmental influences. However, the literature on RF tends to emphasize environmental influences, such as parenting behaviors within the attachment relationship. Various factors involved in the development of RF are summarized in more detail below.

General and parental RF are thought to develop from general human mentalizing ability and shared intentionality, or a motivation to share goals and emotions with others (Sharp & Fonagy, 2008). Parental RF is described as "species-typical social interaction early in ontogeny" (Sharp & Fonagy, 2008, p. 748). Thus, there are three species-specific prerequisites for RF: "capacity to understand intentions," "motivation to share psychological states," and an "ability to communicate relevant information" as a cultural learning mechanism (Tomasello, Carpenter, Call, Behne, & Moll, 2005, as cited in Sharp & Fonagy, 2008). Thus, RF and mentalization more broadly are considered to be "evolutionarily protected," but influenced by the environment, similar to language acquisition (Asen & Fonagy, 2017, p. 11).

In their original description of the concept of RF, Fonagy and colleagues (Fonagy et al., 1991) delineate the development of reflective self-function, which is based on general social understanding (e.g., primary intersubjectivity, joint attention, facial

monitoring, perceiving incongruity between their own affect and others' facial expression) and physical causality (i.e., actions). Earlier on, infants show these signs of eventual reflective self-function, but do not yet differentiate mental causality from physical causality (i.e., that facial expressions are influenced by internal mental states of the other). Interest in mental states and mental causality begins to develop in the second year, and children in their third year understand that others have feelings and intentions different from their own (Fonagy et al., 1991).

RF is also dependent on the acquisition of language. Language provides a vehicle through which infants and children may communicate with others, thereby providing for more social interactions and more opportunities for perspective-taking. There are several reviews highlighting the link between language and mentalizing (e.g., Hughes et al., 2005; Milligan, Astington, & Dack, 2007). Both language and RF are likely facilitated by the development of symbolic thought (Carlson & Zelazo, 2008). It should be noted that RF and language seem to be linked not only in a conceptual sense, but a methodological one as well. Some researchers have raised concerns about the use of interviews in high-risk samples with lower education levels because the interviews rely on language skills (Camoirano, 2017). Others posit that it is difficult to distinguish whether RF as measured by the Reflective Functioning Scale measures a true ability to mentalize rather than an ability to use mental state talk (Camoirano, 2017).

As to be discussed in more detail in the following section, a child's attachment security is thought to be directly related to their developing RF abilities. Each attachment classification is associated with a specific pattern of RF: secure children feel safe exploring the mental states of others; avoidant children are closed off to the mental states of others; resistant children are preoccupied with their own distress and cannot consider the mental states of others; and disorganized children might display maladaptive, hyperactive mentalization (e.g., in contexts of maltreatment, to anticipate

negative emotions in their caregiver) that does not foster an appropriate sense of self (Ensink, 2003). Indeed, in regression analyses, age and attachment were the only significant predictors of child RF (not IQ nor psychopathology) such that children with insecure attachment had significantly lower RF than those with secure attachment (Ensink, 2003).

What variables might explain the link between child attachment security and RF? Primarily, both are influenced by direct parenting behaviors. Child attachment security is an indicator of the quality of parental behaviors that also facilitate the development of mentalizing (Ensink, 2003). The most studied and relevant parenting behavior studied is mental state talk, or mind-minded comments. Parents with high RF are more likely to attend to the mental states of their child and act in a way that makes their child feel understood and cared for, thus facilitating a secure attachment. These parents are also more likely to talk to their children in mental states, coach them through emotional reactions, encourage perspective taking, and resolve interpersonal conflicts using psychological terms (Ensink, 2003; Ensink & Mayes, 2010). Mental state talk and elaborative discourse probably also explains the shared variance between expressive language skills and child RF. Several studies have connected adult and child attachment security, mental state talk, and RF, which will be reviewed in a later section. Notably, many studies linking parenting and RF are completed in early childhood. Some preliminary evidence suggests that parents' influence on RF is at best moderate by middle childhood (Ensink et al., 2015).

Besides the main influences listed above—shared intentionality, early cognitive and social development (e.g., primary intersubjectivity, language, symbolic thought), child attachment security, and parenting behaviors (e.g., mental state talk)—other possible influences include child temperament, parental psychopathology, family

structure, life events, and genetic predispositions, among others (Sharp & Fonagy, 2008).

RF within the Attachment Framework

Overall, RF is thought to further explain the intergenerational transmission of attachment between caregiver and child (see Figure 1 for a conceptual model). The quality of an individual's attachment relationship with their caregiver builds an internal working model with certain expectations of care. An adult's attachment security and internal working model directly affect their ability to consider the mental states of others, including those of their child. From a psychoanalytic perspective, if a parent experienced inadequate care during childhood, they might not be able to consider the mental states of their child as a defense against their own psychological distress. Attachment security and parental RF then impact parenting behaviors. For example, parents with secure attachment and high RF are likely to consider the mental states of their child, which might manifest as sensitive parenting, increased mental state talk, etc. These parenting behaviors facilitate their child's attachment security and RF skills. Finally, a child's attachment security and RF skills will be directly to their attachment security and RF skills as an adult and as a parent, thus completing the cycle.

Here, it is key to note that RF is separate from attachment security. Attachment security refers to the quality of the relationship between caregiver and child based on the internal working model. Both RF and the internal working model foster the process by which individuals organize their experiences to form representations of the self and the other (Sharp & Fonagy, 2008). RF is thought to explain the intergenerational link between parent and child attachment and contribute to the construction and maintenance of family scripts, and is perhaps more closely related to the way in which parents represent their attachment experiences and operate upon them (Asen & Fonagy, 2017; Sharp & Fonagy, 2008). However, researchers recognize that RF is *not* a

complete explanation for the intergenerational transmission of attachment security (Sharp & Fonagy, 2008).

RF is also not an alternative measure of parenting behavior. Parental RF and sensitive parenting share much in common. Both attempt to conceptualize the mother's ability to see things from the infant's point of view (Dykas & Cassidy, 2011). Sensitive parenting is thought to be contingent upon RF skills, as sensitive parents must be responsive to moment-to-moment changes in the child's mental states (Ensink, 2003). Thus, RF facilitates sensitive parenting and is considered a refinement of Ainsworth's maternal sensitivity hypothesis (1978). RF was introduced as a way to explain more of the variance in the association between caregiver and infant attachment security, as maternal sensitivity only accounts for a portion of the variance (van IJzendoorn, 1995; Verhage et al., 2016).

Empirical Evidence for the Role of RF

The following sections summarize the empirical evidence supporting the role of RF in the intergenerational transmission of attachment within both normative and high-risk populations. It is important to study attachment-related processes in both groups, as abnormal development informs normal development, and vice versa (Sroufe & Rutter, 1984). Most of the empirical evidence is comprised of correlational or regression analyses between various components of the model. Concurrent correlational and regression analyses provide support for the hypothesis that these constructs are related, but provide no conclusive information regarding the directionality of effects. As such, longitudinal and mediational analyses are highlighted whenever possible. This review will not focus of associations that have been extensively studied within the literature (e.g., adult attachment and certain parenting behaviors, adult attachment and infant attachment), but instead focus on pieces of the model concerning caregiver and child RF.

Adult attachment security and general RF. In their seminal paper, Fonagy and colleagues (1991) established a concurrent association between adult attachment security and general RF (both using Adult Attachment Interview). RF was most strongly related to coherence of the Adult Attachment Interview (r = .73 in mothers). This was especially notable because AAI coherence (as opposed to other subscales) was the strongest predictor of parent and child attachment classification in their other work (Fonagy et al., 1991), providing initial support for RF as a link between adult and child attachment. Subsequent work has replicated the finding that individuals with secure attachment demonstrate higher levels of RF compared to individuals with insecure attachment (Bouchard et al., 2008). In a randomized trial of psychotherapy for individuals with borderline personality disorder, AAI coherence and RF were moderately correlated (r = .48; Levy et al., 2006).

Adult attachment security and parental RF. In another influential paper, Slade and colleagues (2005) established a longitudinal association between adult attachment security (measured prenatally) and parental RF (using the Parent Development Interview, measured at 10 months). Results indicated that prenatal adult attachment security was significantly related to parental RF such that mothers labeled as secure-autonomous exhibited the highest levels of RF and unresolved mothers exhibited the lowest levels (Slade, Grienenberger, et al., 2005).

Adult attachment security and child RF. Several studies have established concurrent and longitudinal links between caregiver adult attachment security and child mentalization abilities. Children (aged 12 years) of securely attachment mothers (as measured by the AAI) showed higher concurrent levels of RF, as measured by the Child Attachment Interview (Rosso & Airaldi, 2016). More specifically, child RF was correlated with maternal coherence of mind (r = .33) and derogation (r = -.33). Steele and colleagues have demonstrated longitudinal associations between maternal attachment

and child mentalization abilities. They demonstrated that maternal attachment security (measured prenatally) is significantly correlated with (a) child mixed-emotion understanding at age 6 (r = .31; (H. Steele, Steele, Croft, & Fonagy, 1999), (b) adolescents' ability to acknowledge distress in a protagonist during a social cognition task in which they were asked several questions about cartoon vignettes (e.g., how the protagonist might be feeling, if they might be feeling differently on the inside, how their feelings might change, and what will happen next; Steele, Steele, & Johansson, 2002), and (c) child RF 17 years later (as measured by the Adult Attachment Interview; H. Steele, Perez, Segal, Steele, & Ahnert, 2016)

General RF and parental RF. Surprisingly, few studies have studied the associations between general RF and parental RF. One unpublished dissertation showed a moderately strong correlation (r = .53) between general RF (AAI, administered prenatally) and parental RF (Parent Development Interview, administered when their child was 10 months; Crumbley, 2009).

General RF and parenting behaviors. Similarly, few studies have analyzed the associations between general RF and parenting behaviors. Arnott & Meins (2007) demonstrated that general RF (AAI, administered prenatally) was significantly correlated with mind-minded comments toward 6-month-old infants in a normative sample. In a community sample of first-time mothers with 30% reporting histories of physical, sexual, and/or emotional abuse, general RF (AAI, administered prenatally) predicted sensitive and negative parenting behaviors (e.g., physical intrusiveness and withdrawal/neglect) during interactions with their infant. Furthermore, negative behaviors partially mediated the link between general RF and infant attachment organization (Ensink, Normandin, Plamondon, Berthelot, & Fonagy, 2016).

General RF and child attachment security. In the same community sample described above, Ensink and colleagues (2016) showed that prenatal maternal general

RF was significantly related to infant attachment organization during the Strange Situation such that higher RF was associated with higher frequencies of organized attachment.

General RF and child RF. Several studies have established links between general RF and child RF. Maternal general RF (AAI) was concurrently moderately correlated with child RF (age 12, Child Attachment Interview; Rosso & Airaldi, 2016). Interestingly, in this study only maternal general RF and *not* maternal attachment-related variables (coherence of mind) predicted child RF in regression analyses. In this same sample, maternal general RF was marginally correlated with child mental state talk within the Child Attachment Interview (r = .29, p = .06), and maternal general RF significantly predicted mental state talk after controlling for maternal education (Scopesi, Rosso, Viterbori, & Panchieri, 2015). In the only published study examining longitudinal antecedents of RF, maternal general RF (AAI, administered prenatally) predicted their child's RF at age 17 (H. Steele et al., 2016).

Parental RF and parenting behaviors. Grienenberger and colleagues (2005) found that maternal parental RF at 10 months was correlated with disruptive affective communication (i.e., role confusion, fearful behavior, intrusiveness, withdrawal) during the Strange Situation at 14 months (r = .43). Regression analyses suggested that disrupted affective communication mediates the effect of parental RF on infant attachment (Grienenberger et al., 2005). Parental RF has also been correlated with mind-minded comments (r = .39), sensitivity (r = .43), and intrusiveness (r = .41) during structured and unstructured tasks with their 7-month-old infants, and significantly predicted mind-minded comments and intrusiveness after controlling for education and depressive symptoms (Rosenblum et al., 2008).

There is a large literature linking parental RF to parenting behaviors within contexts of risk. In a community sample of socioeconomically and ethnically diverse

families, child-focused parental RF was correlated with maternal support (r = .22) and overcontrol (r = -.26) during a stressful interactive activity (Borelli, Hong, Rasmussen, & Smiley, 2017). In a sample of mothers with childhood trauma, RF was correlated with positive (sensitivity, engagement, flexibility, warmth, positive affect) and negative (overcontrolling/intrusive, hostility) behaviors observed during free play with their 16-month-old infant (r = .33 and -.28, respectively; Huth-Bocks et al., 2014). In a mixed-SES sample of women with and without a history of childhood maltreatment, higher parental RF was correlated with more observed parenting sensitivity (r = .28) and less negative parenting (r = -.35) with their 16-month-old infant (Stacks et al., 2014). In a sample of mothers with substance use disorders, results indicated that after controlling for child age, child gender, and maternal depression, maternal self-focused RF (i.e., ability to think about negative mental states within themselves as a parent) was found to be significantly associated with overall scores for sensitivity to cues (e.g., ability to secure the child's attention), social-emotional growth fostering (e.g., play affectionately), and cognitive growth fostering (e.g., model the task for the child) during a teaching task with their child (Suchman, DeCoste, Leigh, et al., 2010). Finally, in a sample of mothers experiencing postpartum depression, mothers reporting lower levels of mentalizing demonstrated less sensitivity toward their infant following the Still-Face Procedure (Krink, Muehlhan, Luyten, Romer, & Ramsauer, 2018).

Parental RF and child attachment security. Parental RF measured at 10 months was positively correlated with infant attachment at 14 months (r = .34) in a normative sample (Grienenberger et al., 2005). Importantly, mediational analyses indicated that parental RF accounted for a large proportion of the variance between adult and infant attachment (Slade et al., 2005). Stacks and colleagues (2014) examined relationships among maternal RF, parenting, infant attachment, and demographic risk in a mixed-SES sample of women with and without a history of childhood maltreatment.

Results indicated that infants with secure attachment had mothers with higher parental RF compared to infants classified as avoidant or disorganized. Borelli and colleagues (2016) demonstrated that parental RF was associated with greater child attachment security (as measured by greater coherence in the Child Attachment Interview) in a community sample of higher-risk families.

Parental RF and child RF. Parental RF (as measured by the Parent Development Interview) was significantly correlated with adolescent RF (Child Attachment Interview in adolescents; ages 14-18; r = .45-.48) and predicted adolescent RF when controlling for gender, parent education, and several self-reported parenting behaviors (Benbassat & Priel, 2012). Work has shown that within the context of childhood sexual abuse, parental RF is concurrently correlated with children's RF regarding their self (i.e., ability to think about their own mental states; Ensink et al., 2015; Ensink, Bégin, Normandin, & Fonagy, 2016).

Parenting behaviors and child attachment security. There is a large literature linking parenting behaviors with infant attachment, largely focusing on sensitivity (e.g., van IJzendoorn, 1995). Other studies involving aspects of parent emotion-related communication are relevant to the RF model. Disrupted affective communication has been found to mediate the effect of parental RF on infant attachment (Grienenberger et al., 2005). Studies involving mental state talk and mind-minded comments are also closely related to RF. Appropriate mind-minded comments have been found to be related to infant attachment security both concurrently (Meins, Fernyhough, Fradley, & Tuckey, 2001) and longitudinally (Meins et al., 2002). In samples with mixed-SES and mixed histories of abuse, studies have demonstrated direct links between observed negative parenting behaviors and child attachment security, with parenting behaviors mediating the effect of parent RF on child attachment (Ensink et al., 2016; Stacks et al., 2014).

Parenting behaviors and child RF. There is also a large literature linking parenting behaviors with measures of child mentalizing. Recently, Devine and Hughes (2018) published a meta-analysis demonstrating that children's false-belief understanding is associated with parent mental state talk (r = .21) and parent mind-mindedness (r = .16), both of which were independent of any shared effects on children's language ability. It should be noted that these effects were quite modest, and only accounted for 2-4% of the variance in individual differences in false-belief understanding. However, evidence suggests that the effects of parental mental state talk might have stronger effects on child mentalization abilities in older children. For example, longitudinal analyses showed that parent mental state talk had modest to moderate effects on more advanced ToM measures in middle childhood (Ensor, Devine, Marks, & Hughes, 2014).

Child attachment security and child RF (as child). Several studies have demonstrated a longitudinal link between infant attachment security and later child emotion understanding (H. Steele et al., 1999; de Rosnay & Harris, 2002). Several studies have also demonstrated concurrent links between child attachment security and RF (both measured by the Child Attachment Interview) such that children with secure attachments show higher levels of RF (Ensink, 2003; Rosso, Viterbori, & Scopesi, 2015). Venta and colleagues (Venta, Hatkevich, Mellick, Vanwoerden, & Sharp, 2017) showed that adolescents admitted to an inpatient psychiatric hospital with secure attachment mental representations (as measured by the Child Attachment Interview) showed higher social cognition (as measured by a computerized task where participants watch a short film and are asked questions about the protagonists' thoughts and feelings).

Child attachment security and child RF (as adult). In direct contradiction of the role of RF within the attachment framework, there is currently no longitudinal evidence that an individual's infant attachment security predicts their RF abilities in

adulthood. H. Steele and colleagues (2002) found that infant attachment classification did not relate to adolescent mentalization skills during a social cognition task. Similarly, this group found that RF at age 17 years was not related to their previously-measured infant attachment classification (H. Steele et al., 2016).

Summary of empirical evidence. There are a number of areas within the overarching RF model that could be bolstered by additional empirical evidence. For example, in both normative and high-risk samples, additional longitudinal research is needed to support associations linking general RF to parental RF and infant attachment, as well as child attachment security to their RF as an adult. Furthermore, additional longitudinal research within high-risk samples is needed to understand additional predictors of child RF, including adult attachment security, general RF, parental RF, parenting behaviors, and infant attachment security. Nonetheless, the empirical evidence largely supports the role of caregiver RF in a number of parenting and child outcomes, as well as a mediator of the intergenerational transmission of attachment security and attachment-related mental representations in both normative and high-risk populations.

RF as an Intervention Target

Given the existing body of empirical evidence suggesting that parental RF is important for positive parenting behaviors and child outcomes, many interventions have turned their focus to improving parents' RF skills within the context of the parent-child relationship. Perhaps one of the most-studied interventions specifically designed to improve the parent-child relationship via RF skills is Minding the Baby, which combines elements of the Nurse-Family Partnership with parent-infant psychotherapy (Slade, Sadler, et al., 2005). Minding the Baby was designed for pregnant, first-time mothers (ages 14-25 years) in an inner-city community. Results from a randomized controlled trial demonstrated intervention effects on secure attachment, mother-infant

communication, and other outcomes such as involvement in child protective services (Ordway et al., 2014). There were no main effects of the intervention on parental RF, but there were significant increases in parents who had low baseline RF, suggesting that the intervention might work especially well or via different mechanisms for parents with low baseline RF pre-intervention (Sadler et al., 2013).

Other intervention programs have targeted different at-risk populations, including mothers with substance use disorders (e.g., Mothers and Toddlers Program; Suchman, DeCoste, Castiglioni, Legow, & Mayes, 2008), mothers in prison (e.g., New Beginnings; Sleed, Baradon, & Fonagy, 2013), foster and adoptive parents (e.g., The Family Minds Program; Bammens, Adkins, & Badger, 2015), and parents of children with attachment disorders (e.g., Trauma and Attachment Group Program; Ashton, O'Brien-Langer, & Silverstone, 2016).

Although most attachment-based interventions were not specifically designed with RF in mind, its proposed role in the intergenerational transmission of attachment security has encouraged researchers to study RF as a potential outcome or mechanism through which attachment-based interventions might benefit families. One such intervention is Circle of Security, which aims to increase parent's ability to observe themselves interacting with their child and help parents become aware of their own representations of their child. One research group (Huber, McMahon, & Sweller, 2015) showed that within a Australian sample of mothers referred to a metropolitan community-based infant and early childhood mental health service, RF significantly changed only for parents with low levels of pre-intervention RF and parents with lower education (i.e., no postsecondary education). Thus, there is evidence that RF might be a mechanism through which attachment-based interventions benefit families, especially for parents with low RF abilities to begin with.

Intervention research thus far suggests that mentalization- and attachment-based interventions are effective in increasing parental RF, at least in small increments. There is limited evidence that RF mediates intervention effects on more distal outcomes such as parenting behavior and child functioning. To better study intervention outcomes, there is a need for additional research that focuses on longitudinal assessments of RF, various aspects of parental functioning, and child functioning. Additional research is also needed to indicate parent, family, and child characteristics that moderate treatment response.

Unique Roles of Attachment Representational Measures

As the previous sections have highlighted, researchers have developed multiple constructs and measures to test hypotheses proposed by attachment theory in the quest to understand the intergenerational transmission of social and emotional functioning within relationships. The vast majority of attachment research in adulthood has focused on attachment security and state-of-mind (measured by the AAI) as "gold-standard" operationalizations of attachment mental representations. Smaller, yet valuable and growing, bodies of research have highlighted SBSK and RF as representational constructs that might mediate associations between caregiver attachment and infant attachment, as well as associations between infant attachment and subsequent adult attachment.

However, as Waters and Roisman (2019) point out, in a body of work as large and established as the attachment theory literature, it is important to highlight the *unique* contributions that constructs such as SBSK and RF might provide to the literature in order to avoid the "old wine in a new bottle" critique (p. 164). Determining the most empirically valuable measures of attachment-related constructs will only serve to strengthen the attachment literature (Fraley & Roisman, 2014). Again, it is important to study these constructs and their associations within diverse samples (i.e., both

normative- and high-risk) to gain a fuller understanding of how attachment processes function in the general human population.

Below is a summary of additional existing research aiming to correlate and differentiate AAI security/state-of-mind, SBSK, and RF.

AAI State-of-Mind versus SBSK

R. D. Steele and colleagues (2014) demonstrated that an infant's attachment security and experienced maternal sensitivity similarly predicted their adult SBSK and AAI state-of-mind (i.e., no significant differences in their bivariate correlations) within a longitudinal, normative-risk sample. SBSK was more strongly correlated with paternal sensitivity (R. D. Steele et al., 2014). Within a longitudinal, high-risk sample, however, SBSK at age 19 and 26 years was more strongly predicted by antecedent maternal sensitivity than AAI security was (T. E. A. Waters et al., 2017).

T. E. A. Waters and colleagues (2018) also recently demonstrated that AAI coherence and SBSK are differentially related to aspects of adult relationship functioning, particularly with their child. For example, only SBSK was significantly associated with infant attachment security in the next generation. Conversely, only AAI coherence was significantly associated with interview ratings of their supportive parenting. Neither AAI coherence nor secure base were uniquely associated with observational ratings of their parenting quality when controlling for the other. Authors postulated that SBSK might be more related to expectations of support during times of distress (hence the correlation with infant attachment security), whereas AAI coherence might be more related to expectations of support during times of exploration (hence the correlation with supportive parenting).

AAI State-of-Mind versus RF

In a methodological sense, there are similarities between RF and the traditional AAI coding system. RF is similar to the metacognitive monitoring scale, although it

expands upon it by acknowledging non-explicit thinking about feelings rather than only conscious efforts to think about thinking (Jessee, Mangelsdorf, Wong, Schoppe-Sullivan, & Brown, 2016). High scores on RF and coherence require open discussions about cause-and-effect within relationships. However, as long as individuals provide adequate support for their examples and anecdotes, one could conceivably receive a high score on AAI coherence without referring mental states, thus receiving a lower score on RF (Jessee et al., 2016).

As stated previously, secure adults (as measured by the AAI) have significantly higher RF than insecure adults (Bouchard et al., 2008; Fonagy et al., 1991), and RF is associated with AAI coherence (r = .73 in women, r = .64 in men; Fonagy et al., 1998). Jessee and colleagues (2016) found that RF loaded onto the latent factor that was previously found to differentiate secure from dismissing individuals (Haltigan et al., 2014). Although RF and AAI coherence loaded onto a common factor (.50 and .91, respectively), their correlation (r = .39) was not as strong as reported by Fonagy and colleagues. This was hypothetically due to the fact that RF coders in the study had not been trained on the AAI state-of-mind coding system, thereby reducing confounding. Nonetheless, results suggest that the two constructs are related but do not entirely overlap (Jessee et al., 2016). The studies cited above used normative-risk samples. In a randomized trial of psychotherapy for individuals with borderline personality disorder (i.e., a high-risk sample), AAI coherence and RF were moderately correlated (r = .48; Levy et al., 2006).

RF versus SBSK

Limited research has attempted to examine similarities and differences between RF and SBSK. One study demonstrated only weak associations (r = .25) between SBSK and parental RF (i.e., specific to their relationship with their current child, not their own attachment experiences as a child) in a sample of mothers oversampled for childhood

maltreatment (Huth-Bocks et al., 2014). However, several researchers (e.g., Huth-Bocks et al., 2014; T. E. A. Waters et al., 2018) suggest that secure base scripts and RF might tap different representational systems (attachment system, caregiving system, romantic system) depending on how they are assessed. To our knowledge, no study has examined the associations between SBSK and RF within the adult attachment system (i.e., an adult thinking about their own childhood experiences), particularly within a high-risk sample.

Remaining Questions

Many questions remain regarding the relative roles of AAI state-of-mind, SBSK, and RF within the attachment framework. Several recent studies (Haltigan et al., 2014; Jessee et al., 2016; T. E. A. Waters et al., 2018) demonstrate the value of structural and comparative analyses in determining the unique value of these representational measures to answer vital questions regarding attachment theory. To our knowledge, no study has examined the associations among all three measures—AAI state-of-mind coding, SBSK, and RF—within the same sample (neither normative-risk nor high-risk).

Additionally, it is important to study how these representational constructs develop over time, especially if they are found to be unique and/or independent. Substantial work has been done to examine the longitudinal antecedents of AAI security (e.g., Groh et al., 2014; Booth-LaForce et al., 2014), AAI state-of-mind codes (e.g., Haydon, Roisman, Owen, Booth-Laforce, & Cox, 2014), and SBSK (R. D. Steele et al., 2014; T. E. A. Waters et al., 2017). A review of the literature on RF suggests that additional longitudinal research is needed to understand predictors of adult RF, including infant attachment security and parenting behaviors. To our knowledge, only one study has examined early antecedents of later RF within a prospective, longitudinal study. Initial evidence suggests that in a normative sample, infant attachment security does not predict the child's RF in late adolescence (H. Steele et al., 2016). No longitudinal study

of early antecedents of adult RF has been reported, particularly within a high-risk sample.

Current Study

This study aims to answer lingering questions regarding the development and relative significance of RF using a prospective, longitudinal sample of high-risk individuals.

Aim 1

The first aim of this study is to explore antecedents of RF within a prospective, longitudinal sample. More specifically, this study aims to examine whether adult RF is significantly predicted by infant attachment security and maternal sensitivity, as the literature would suggest. It is hypothesized that infant attachment security and maternal sensitivity will each significantly predict adult RF.

Aim 2

The second aim of this study is to examine the value that RF adds to the attachment framework over and above existing constructs (AAI state-of-mind and SBSK). This study intends to do so in two separate yet complementary ways.

Aim 2a. One goal of this aim is to assess whether RF provides unique information regarding adult attachment mental representations. More specifically, this study aims to determine the factor structure of AAI state-of-mind coding subscales, SBSK, and RF when all are examined simultaneously in the same sample. Based on previous factor analyses of AAI coding and RF within a normative sample (Jessee et al., 2016), as well as high correlations between AAI coherence and secure base script knowledge (r = .64; T. E. A. Waters et al., 2013), it is expected that RF, AAI coherence, and SBSK will load onto a single factor that differentiates between secure and dismissing individuals. It is unclear whether a two- or three-factor model will arise given

mixed results in previous analyses (Roisman et al., 2007; Haltigan et al., 2014; Jessee et al., 2016).

Aim 2b. Another goal of this aim is to assess whether RF is uniquely associated to attachment-related constructs in childhood. More specifically, this study aims to determine whether early measures of caregiver-child relationship quality (infant attachment security and maternal sensitivity) are differentially related to RF compared with AAI coherence and SBSK. Analyses comparing antecedents of AAI coherence and SBSK have already been completed in this sample (T. E. A. Waters et al., 2017), but not with RF. Hypothesized results are somewhat contingent on analyses from Aim 2a. For example, if RF, SBSK, AAI subscales, and all load strongly onto a common factor, it would not be expected that RF would be differentially related to early measures of caregiver-child relationship quality. However, if RF loads separately from the factor that differentiates between secure and dismissing individuals (i.e., the factor that AAI coherence loads onto), then one might expect differential associations between early measures of caregiver-child relationship quality and the three attachment representation constructs.

Methods

Participants

Data for testing these hypothesis draws upon the Minnesota Longitudinal Study of Risk and Adaptation (MLSRA), an ongoing prospective, longitudinal study that aims to understand “critical influences on individual development” (Sroufe et al., 2005). Between 1975 and 1977, 267 first-time mothers in their third trimester were recruited from public health clinics in Minneapolis, Minnesota. Families were qualified as high-risk because of their eligibility for public assistance for prenatal care and delivery (i.e., mothers’ incomes were below the federal poverty level). At the time of delivery, 65% were single (61%), and 42% had not completed high school. Mothers ranged in age from 12 to 34 years (*M*

= 20.52, *SD* = 3.63), and 48% were teenagers. The children born to these mothers have been regularly assessed throughout their lifetime to evaluate their functioning and competence in key developmental domains (e.g., attachment, peer relationships, academic performance). Researchers have gathered information through direct observations of behavior and interviews with caregivers, teachers, peers, romantic partners, and the participants themselves over time.

The current study includes the subset of participants who participated in the age 26 year assessment (*N* = 164) of the MLSRA. Within this subsample, 51% were female, and 68% were non-Hispanic Caucasian. This subsample did not significantly differ from the original sample with regards to child sex and racial/ethnic identity. However, participants with RF scores available at the age 26 year assessment had mothers with higher levels of education ($F(1, 264) = 17.62$, $p < .001$) and higher socioeconomic index ($F(1, 198) = 14.36$, $p < .001$) compared to those participants who did not complete the AAI at age 26. This likely reflect higher attrition rates for participants with histories of higher socioeconomic risk.

Measures

Infant Attachment Security

Infant attachment security was assessed at 12 and 18 months by the Strange Situation Procedure (SSP; Ainsworth et al., 1978). The laboratory procedure is designed to activate the infant attachment system through a series of brief moderately stressful episodes including caregiver-child separations and reunions. Infant-caregiver attachment quality is based on infant use of the caregiver as a secure base from which to explore the experimental room, response to the presence of an unfamiliar adult, response to brief separations from the caregiver, and use of the caregiver to resolve separation-related distress on reunion. Interactive relationship-based ratings of proximity seeking, contact maintenance, contact resistance, avoidance as well as

disorganization/disorientation serve as the basis for classification into one of four categories: secure, insecure-avoidant, insecure-resistant, and insecure-disorganized.

In the MLSRA project, 212 assessments were conducted and available for coding at 12 months; 197 assessments were conducted and available for coding at 18 months. Of these, a reduced number were available for subsequent disorganization/disorientation coding (*n* = 122, 12 months; *n* = 83, 18 months). Interrater reliabilities for secure and insecure avoidant and resistant classifications were: 89% agreement at 12 months; 92% agreement at 18 months. Interrater reliability for disorganization classification across 12 and 18 months was 86%.

For cases with available disorganization data, consistent with standard classification guidelines, disorganized/secure cases were classified as insecure. Secure cases that lacked disorganization ratings remained as secure, and insecure cases remained insecure regardless of the availability of disorganization ratings. The three insecure groups (avoidant, resistant, disorganized, including disorganized/secure) were then combined at each time point to form a composite insecure category.

For purposes of data analysis and to maximize the use of all available data (*N* = 220), a composite index indicating the proportion of times secure was created. For infant-caregiver dyads assessed at both 12 and 18 months (*n* = 189), the composite attachment variable represents the actual percentage of times the infant-parent attachment relationship was classified as secure across the two assessments (.00, .50, or 1.00). For the small number of infant-caregiver dyads classified secure at one assessment but who did not participate at the other assessment (*n* = 16), we hardcoded those cases as .75, to reflect the fact that the moderate stability of attachment security observed from 12-18 months in the MLSRA was not so high as to have confidence that such cases would have been scored as secure at the other assessment (1.00), nor could we be confident that they would have been scored as insecure at the other assessment

(.50). Likewise, cases scored as insecure at one assessment but lacking data for the other assessment (*n* = 15), were hardcoded as .25.

Maternal Sensitivity

Based on previous work with the MLSRA (e.g., Raby, Roisman, Simpson, Collins, & Steele, 2015; T. E. A. Waters et al., 2017), maternal sensitivity was measured by creating a composite score of sensitive caregiving assessed seven times from age 3 months to 13 years using a number of developmentally appropriate tasks, descriptions of which are provided below. It should be noted that “maternal” does not necessarily refer exclusively to biological mothers, although the vast majority of sensitive parenting assessments were indeed conducted with biological mothers. The use of the term “maternal” sensitivity instead refers to the sensitive parenting provided by a maternal agent or primary caregiver.

At 3 and 6 months old, examiners video recorded mothers and infants completing semi-structured tasks at home. Observations of feeding situations were completed at 3 and 6 months to assess maternal sensitivity to babies' cues and needs, and mother's ability to correctly read baby's signals and to respond to them appropriately. Observations of caregiver-infant play time were also completed at 6 months to assess maternal supportiveness, inventiveness, patience, and attitude toward playing with the infant. Overall sensitivity was coded at each time point using the 9-point Ainsworth Maternal Sensitivity Scale (Ainsworth et al., 1978). Coder agreement was moderate to high for the 3-month observations (Lawlis-Lu index $T = .75$, $p < .05$) and interrater reliability was high for the 6-month observations (*ICC* = .89).

Caregiver and child completed different problem-solving tasks in the laboratory at 24 months, 42 months, and 13 years old. At 24 and 42 months, caregivers were instructed to let their child attempt difficult tasks independently, then provide help when needed (e.g., obtaining a prize out of a Plexiglas tube at 24 months; completing an Etch-

a-Sketch maze at 42 months). At 13 years, caregivers were instructed to work together with their child to complete collaborative tasks (e.g., creating an anti-smoking campaign). Interactions were video recorded. Trained coders used a 7-point observational scale to rate caregivers on supportive presence at each time point, characterized by the balance between promoting autonomy by serving as a secure base (i.e., helping the child feel comfortable with the task) and remaining attentive and involved enough to provide emotional and instrumental support when appropriate and needed. Interrater reliability was high across all three time points (*ICC* = .84, .87, and .86, respectively).

Caregiver and child completed the Home Observation for Measurement of the Environment (HOME) Inventory (Caldwell & Bradley, 1984) at 30 and 72 months. The HOME is an interview- and observation-based measure that assesses children's access to social, emotional, and cognitive support within the home environment. The maternal emotional and verbal responsivity subscale was used to capture caregiver sensitivity. The subscale comprised 11 items at 30 months (e.g., "Mother spontaneously praises child's qualities or behavior twice during visit," "Mother responds to child's vocalizations with a vocal or verbal response"; α = .72) and 6 items at 72 months (α = .68). Scores represent the total number of specific, desirable behaviors observed by the interviewer at each time point ("No" = 0, "Yes" = 1).

Previous principal components analyses highlighted a single caregiver sensitivity component that accounted for 41% of the variance in these individual measures, with loadings ranging from .53 to .70 (Raby et al., 2015). Thus, the seven measures of caregiver sensitivity were standardized to create a single measure of cumulative caregiving sensitivity across childhood (i.e., z-scores were calculated and averaged within each participant; α = .74). Subsequent research further validates the use of this caregiver sensitivity composite given its associations with theoretically-relevant

constructs (e.g., electrodermal reactivity during conflict discussions with romantic partners in adulthood, Raby et al., 2015; adult attachment representations, T. E. A. Waters et al., 2017).

Adult Attachment Representation

Adult Attachment Interview. The Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985) is a semi-structured interview that aims to tap into current mental representations of attachment experiences. The full interview, which contains 20 questions and takes approximately one hour to complete, asks participants to reflect upon earlier aspects of their childhood and family life (prior to age 13) and evaluate how these early experiences might have impacted their adult functioning. AAIs were transcribed verbatim and all identifying information was removed from the transcripts before they were coded.

State-of-Mind Coding. AAIs were coded using the most recent version of the Main and Goldwyn system available at the time of data collection and analysis (1998). Using this system, trained coders assigned scores on 13 nine-point scales: coherence of mind, coherence of transcript, metacognitive monitoring, mother idealization, father idealization, lack of recall, derogation, fear of loss, mother anger, father anger, passivity, unresolved loss, and unresolved trauma. ICC estimates of interrater reliability were calculated using SPSS statistical package version 24 (SPSS Inc., Chicago, IL) based on a mean-rating, absolute-agreement, two-way mixed-effects model. Interrater reliabilities for state-of-mind scales ranged from .65 (derogation) to .94 (unresolved loss), indicating moderate to excellent reliability (Koo & Li, 2016). Given high correlations between coherence of mind and coherence of transcript (r = .97), coherence of mind was used for subsequent analyses, as consistent with previous studies (Haltigan et al., 2014; Jessee et al., 2016). Additionally, cases without applicable unresolved loss and/or abuse

experiences received a score of 1 for these scales (indicating no unresolved loss and/or abuse) so that such cases could be included in the factor analysis.

In addition, coders categorized each transcript as either secure (autonomous) or insecure (dismissing, preoccupied, or unresolved). Agreement between coders for this dichotomous variable was 81% (κ = .59, p < .001).

Secure Base Script Knowledge. AAIs were coded for secure base script knowledge using the secure base script coding system (T. E. A. Waters et al., 2017). With this system, coders determine the extent to which participants' answers to the first several questions of the AAI (up to and including the upset question) communicate expectations that appear to follow a secure base script. Coders assign a score on a 9-point scale. According to T. E. A. Waters and colleagues (2017), a score of 9 indicates a secure base script structure followed by several specific event narratives, a score of 4 indicates the narratives contain numerous expectations consistent with secure base script knowledge but no specific event narratives were organized around the script, and a score of 1 reflects several specific scenes that directly violate secure base script structure. AAIs were coded by trained reliable coders, and interrater reliability at the age 26 year assessment was good (*ICC* = .82; Koo & Li, 2016).

Reflective Functioning. AAIs were coded for RF using the Reflective Functioning Scale (Fonagy et al., 1998). The Reflective Functioning Scale aims to assess the extent to which individuals demonstrate: an awareness of the nature of mental states, an explicit effort to tease out mental states underlying behavior, recognition of developmental aspects of mental states, and willingness to entertain mental states in the context of other relationships (i.e., with the interviewer). Coders assign a score on a 11-point scale that ranges from -1 to 9. A score of -1 represents negative RF, in which the speaker expresses hostility or active evasion in response to an opportunity for reflection. A score of 1 represents absent RF, in which the speaker is

generally out of touch with the mental states of self and others (e.g., does not mention mental states, or provides entirely egocentric explanations for behaviors). A score of 3 represents low or questionable RF, in which the speaker provides some evidence of consideration of mental states albeit at a fairly superficial level. A score of 5 represents ordinary RF, in which the speaker makes sense of their experience in terms of mental states and has a consistent model that requires minimal inference from the rater, even if these mental states and models are relatively simple. A score of 7 represents marked RF, in which the speaker provides clear and frequent integration of the states of minds of their self and those around them. Finally, a score of 9 represents exceptional RF, in which the speaker provides consistent elaboration of complex mental states (e.g., causal accounts, intricate family dynamics) in a surprising and sophisticated manner. All AAI questions are considered in arriving at an overall RF score, although 'demand' questions (i.e., questions that require the speaker to demonstrate self-reflective abilities: closeness, rejection, impacts on adult personality, parents' behavior, loss (if applicable), trauma (if applicable), changes in relationship with parents, and current relationship with parents) are meant to carry more weight than 'permit' questions (i.e., those that *allow* the speaker to demonstrate self-reflective abilities rather than *require* them). In other words, non-reflective responses to permit questions should not carry as much weight as they would if provided in response to a demand question.

RF coders were not trained on the Main and Goldwyn state-of-mind coding system nor the secure base script knowledge coding system. Scoring agreement was assessed on 27% of the transcripts. Intra-class correlation estimates of interrater reliability were calculated using the irr package (Gamer, Lemon, Fellows, & Singh, 2019) in R 3.6.1 (R Core Team, 2019) based on a mean-rating, absolute-agreement, two-way mixed-effects model. According to Koo & Li (2016), interrater reliability was moderate

(*ICC* = .82, $p < .001$). Independent scorers agreed within one point on 73% of the cases. Disagreements were resolved through discussion.

Covariates

Consistent with recent analyses using MLSRA data (e.g., Raby, Labella, Martin, Carlson, & Roisman, 2017; T. E. A. Waters et al., 2017), participant sex (male = 1; female = 2), ethnicity (1 = White/non-Hispanic; 0 = other), childhood socioeconomic status (SES), and maternal education were used as covariates in regression analyses. SES was assessed by averaging the Duncan Socioeconomic Index (Stevens & Cho, 1985; Stevens & Featherman, 1981) of the primary caregiver at seven time points (42 months, 54 months, Grade 1, Grade 2, Grade 3, Grade 6, and 16 years). Maternal education was assessed by averaging number of years of schooling at seven time points (3 months prior to birth, 42 months, Grade 1, Grade 2, Grade 3, Grade 6, and age 16 years). Additionally, given the hypothesis that adults' attachment states-of-mind might change after having a child (Fonagy et al., 1991), participants' parent status at 26 years (no child = 0; child = 1) was explored as a potential covariate.

Analytic Plan

All statistical analyses were performed using R 3.6.1 (R Core Team, 2019).

Missing Data

Within the MLSRA subsample of individuals with RF scores (i.e., completed the AAI at age 26), missing data ranged from 0% missing (demographic covariates, maternal sensitivity, AAI passivity) to 1.2% missing (AAI mother idealization, SBSK). Several AAI subscales (father idealization, father anger, unresolved loss, unresolved trauma) had higher levels of missingness (7.3% to 12.2%) because these experiences were not applicable (i.e., limited contact with father, no significant loss or trauma).

According to Little's MCAR test (Little, 1988) using the BaylorEdPsych package (Beaujean, 2012) in R, the missing data appeared to be missing completely at random

(χ^2 [304] = 334.96; p = .11). For correlational and descriptive statistics, missing data were excluded and pairwise deletion was used when applicable. Full information maximum likelihood (FIML) estimation was used for regression and factor analyses to provide unbiased estimates while using all available data (Little, Jorgensen, Lang, & Moore, 2014).

Hypothesis Testing

Aim 1. To examine whether adult RF at age 26 is predicted by infant attachment security and caregiver sensitivity, a multiple linear regression was performed. Reflective Function Scale scores from the age 26 AAI were regressed onto infant attachment security (proportion of times secure), the maternal sensitivity composite, and covariates (participant sex, race/ethnicity, childhood socioeconomic status composite, and maternal education composite). A power analysis conducted using G*Power determined that a sample size of 164 would be able to detect small to medium effect sizes (f^2 = .04, power = .80, α = .05) according to Cohen's conventions (small: f^2 = .02; medium: f^2 = .15; Cohen, 1998). Regressions were run using the lavaan package (Rosseel, 2012) in R using maximum likelihood estimation.

Aim 2a. To determine whether the three attachment representation constructs represent a single underlying latent factor, exploratory factor analyses (EFA) using maximum likelihood estimation with oblique rotation (direct oblimin) were performed, in accordance with other studies analyzing the latent structure of the AAI (Haltigan et al., 2014; Jessee et al., 2016; Raby et al., 2017). Manifest variables were entered in a stepwise fashion. All of the AAI state-of-mind subscales were entered in the first EFA to replicate previous findings using the MLSRA sample (Raby et al., 2017). Next, RF and SBSK were each entered into separate EFAs. Finally, all variables (AAI state-of-mind subscales, SBSK, and RF) were entered simultaneously into the final EFA. For each

iteration, the best-fitting model was determined by examining eigen values, scree plots, parallel analysis, and fit indices (non-significant Chi-Square Test of Model Fit; Tucker-Lewis Index (TLI) ≥ .95; Root Mean Square Error of Approximation (RMSEA) ≤ .06; Hu & Bentler, 1999). EFAs were performed using the psych package (Revelle, 2019) in R.

Aim 2b. To determine whether infant attachment security and maternal sensitivity differentially predict RF, AAI state-of-mind, and SBSK, Steiger's *Z* tests were planned to compare the strength of the correlations between the variables. In Steiger's *Z* tests, correlation coefficients are converted to *z*-scores using the Fisher's *r*-to-*z* transformation and the covariance of the estimates is calculated (Steiger, 1980). In the current study, correlation coefficients between RF and maternal sensitivity, SBSK and maternal sensitivity, and RF and SBSK were entered to yield a *z*-score that determined whether the correlation between RF and maternal sensitivity was significantly different than the correlation between SBSK and maternal sensitivity. The same analyses were performed with RF and the traditional AAI state-of-mind subscales. For these analyses, coherence of mind was used, as this is used as a summary variable within the Main and Goldwyn state-of-mind coding system to differentiate secure from insecure attachment representations. Comparisons between maternal sensitivity, AAI coherence of mind, and SBSK have already been performed (T. E. A. Waters et al., 2018). With a sample size of 164 in the current study, it was determined that there was sufficient power to detect medium to large differences in correlations, but not small differences (e.g., $r = .30$ vs. $r = .35$). Steiger's *Z* tests were performed using the cocor package (Diedenhofen & Musch, 2015) in R.

Results

Descriptive statistics for all study variables are displayed in Table 1. Bivariate correlations for major study variables (including covariates, measures of the caregiver-

child relationship, and primary measures of adult attachment representations) are shown in Table 2.

Aim 1. Predictors of RF

As indicated by the bivariate correlations shown in Table 2, neither of the hypothesized antecedents—infant attachment security and maternal sensitivity—were significantly correlated with adult RF. There was a significant effect of sex, $t(150.67) = -4.56$, $p < .001$, such that females ($M = 3.46$, $SD = 1.75$) had higher levels of RF compared to males ($M = 2.43$, $SD = 1.35$). Individuals with higher childhood SES also had higher levels of RF ($r = .20$, $p < .05$).

As originally planned, a multiple linear regression was performed with RF regressed onto covariates (sex, race/ethnicity, maternal education, SES), infant attachment security, and maternal sensitivity, shown in Table 3. In step 1, only covariates were entered, accounting for 17.3% of the variance in RF. Comparable to the bivariate correlations, both sex ($B = 1.16$, $SE = .24$, $p < .001$) and childhood SES ($B = .03$, $SE = .01$, $p < .05$) significantly predicted RF when controlling for other covariates. In step 2, infant attachment security and maternal sensitivity were added. Variables explained 20.7% of the variance in RF. The caregiver-child relationship variables explained marginally more variance in RF compared to covariates alone (χ^2 [2] = 5.24; $p = .07$). Sex and childhood SES still significantly predicted RF when controlling for all other variables. Interestingly, maternal sensitivity was a significant predictor such that higher levels of maternal sensitivity predicted *lower* levels of RF ($B = -.56$, $SE = .24$, $p < .05$).

Aim 2a. Adult Attachment Correlates of RF

Bivariate correlations among the adult attachment representational variables (including AAI state-of-mind codes, SBSK, and RF) are shown in Table 4. Although metacognitive monitoring and fear of loss were not included in later factor analyses, per

previous AAI factor analyses, they were included in the bivariate correlations for descriptive information, as there is limited information in the literature regarding correlations between RF and AAI state-of-mind codes other than coherence of mind, especially within a large, high-risk sample. As indicated in Table 4, RF was significantly positively correlated with maternal anger (r = .50, p < .001), passivity (r = .45, p < .001), metacognitive monitoring (r = .43, p < .001), paternal anger (r = .42, p < .001), unresolved loss (r = .34, p < .001), and unresolved abuse (r = .29, p < .001). RF was significantly negatively correlated with maternal idealization (r = -.45, p < .001), lack of recall (r = -.42, p < .001), paternal idealization (r = -.32, p < .001). Unexpectedly, RF was significantly negatively correlated with SBSK (r = -.18, p < .05), and it was not significantly correlated with coherence of mind (r = .07, p > .10).

Given the lack of expected correlation between RF and coherence of mind—a commonly-used summary variable that is highly correlated with adult attachment security—exploratory follow-up analyses compared mean levels of RF between AAI security classifications. The difference in RF between secure (M = 3.13, SD = 1.51) and insecure (M = 2.72, SD = 1.74) individuals was not significant, t(160.69) = -1.60, p = .11. However, when insecure individuals were parsed into dismissing and preoccupied classifications in the three-way classification system, groups showed significant differences in RF, F(2, 160) = 55.12, p < .001. Post-hoc analyses (Tukey honest significant difference test) revealed that individuals with preoccupied classification had significantly higher levels of RF (M = 4.83, SD = 1.34) compared to individuals with secure (M = 3.13, SD = 1.51) and dismissing (M = 1.80, SD = .88) classifications, and secure individuals had higher levels of RF compared to individuals with dismissing classifications.

EFAs were conducted in a stepwise fashion to better isolate the individual impacts of SBSK and RF on the AAI structure previously identified using the age 26

MLSRA data (Raby et al., 2017). Factor loadings, amount of variance explained, fit indices, and interfactor correlations are shown in Table 5.

For model 1 (AAI state-of-mind variables only), initial evidence from the scree plot indicated three factors with an eigenvalue greater than one, although parallel analysis suggested only two factors. Given previous evidence for both two- and three-factor models of the AAI in the literature (Roisman et al., 2007; Haltigan et al., 2014), both models were tested. The two-factor model demonstrated suboptimal fit: χ^2 (26) = 72.5, $p < .01$; TLI = .84; RMSEA = .10. Considering loadings (λ) only greater than .30 and placing scales onto the factor that they loaded most strongly onto, factor loadings were consistent with Raby and colleagues (2017). Factor I consisted of coherence of mind (λ = -.80), maternal idealization (λ = .77), lack of recall (λ = .68), and paternal idealization (λ = .54). Factor II consisted of passivity (λ = .70), maternal anger (λ = .66), unresolved abuse (λ = .59), paternal anger (λ = .53), unresolved loss (λ = .49), and derogation (λ = .48). The model explained 45% of the variance.

The three-factor model showed better fit compared to the two-factor model: χ^2 (18) = 34.2, $p < .05$; TLI = .92; RMSEA = .07. The model explained 52% of the variance. However, after only considering loadings greater than .30 and placing scales onto the factor that they loaded most strongly onto, the only indicator of Factor III was paternal idealization (λ = .99).

Thus, the two-factor model was adopted and retained for subsequent EFAs, unless parallel analysis suggested a better-fitting model. Consistent with previous factor analyses (Haltigan et al., 2014; Jessee et al., 2016; Raby et al., 2017), Factor I appeared to differentiate secure from dismissing individuals, whereas Factor II reflected preoccupation and unresolved loss and abuse. These factors were not strongly correlated (r = .03).

For model 2 (AAI state-of-mind variables and SBSK), parallel analysis suggested two factors. Fit indices were suboptimal: χ^2 (34) = 84.3, p < .001; TLI = .85; RMSEA = .09. Interestingly, SBSK loaded negatively (λ = -.48) onto Factor II (reflecting preoccupation and unresolved loss/abuse). Factor loadings from the state-of-mind scales were relatively unchanged from Model 1. See Table 5 for more details.

For model 3 (AAI state-of-mind variables and RF), parallel analysis suggested two factors. Fit indices were also suboptimal: χ^2 (34) = 85.7, p < .001; TLI = .86; RMSEA = .10. Similar to models 1 and 2, Factor I consisted primarily of coherence of mind (λ = -.96), maternal idealization (λ = .58), lack of recall (λ = .53), and paternal idealization (λ = .39), although the latter three also showed significant negative loadings ($|\lambda|$ > .30) onto Factor II. Unlike models 1 and 2, derogation loaded higher on Factor I (λ = .37) than Factor II (λ = .36). Factor II continued to reflect preoccupation and unresolved loss/abuse: passivity (λ = .69), maternal anger (λ = .68), paternal anger (λ = .54), unresolved abuse (λ = .51), and unresolved loss (λ = .47). Unexpectedly, RF loaded most strongly onto Factor II (λ = .71) rather than Factor I. The two factors were not strongly correlated (r = -.03). See Table 5 for additional details.

Finally, for model 4 (AAI state-of-mind variables, SBSK, and RF), parallel analysis suggested two factors. Fit indices were again suboptimal: χ^2 (43) = 99.5, p < .001; TLI = .86, RMSEA = .09. Factor I continued to reflect a differentiation between secure and dismissing individuals: coherence of mind (λ = -.92), maternal idealization (λ = .64), lack of recall (λ = .58), and paternal idealization (λ = .43). Both SBSK (λ = -.42) and RF (λ = .68) loaded onto Factor II, along with maternal anger (λ = .70), passivity (λ = .69), paternal anger (λ = .56), unresolved abuse (λ = .55), unresolved loss (λ = .49), and derogation (λ = .40). The two factors were not strongly correlated (r = -.03). See Table 5 for additional details.

Aim 2b. Comparing antecedents of AAI state-of-mind, SBSK, and RF

Given the lack of correlation between RF and infant attachment security, as well as the negative association between maternal sensitivity and RF, Steiger's *Z* tests to compare the strengths of the correlations between hypothesized antecedents (infant attachment security and maternal sensitivity) and adult attachment representational measures (coherence of mind, SBSK, and RF) were not included in this study as originally planned.

Discussion

Overall, this dissertation project aimed to examine antecedents and the unique value of RF within the attachment framework using the MLSRA—a high-risk, prospective, longitudinal sample. Overall, hypotheses were not supported. Bivariate correlations and regression analyses revealed that adult RF was not associated with infant attachment security and was *negatively* associated with maternal sensitivity. Additionally, RF was not associated with AAI coherence of mind, and was negatively correlated with SBSK. Exploratory follow-up analyses indicated that individuals with preoccupied classifications showed the highest levels of RF, followed by those with secure, and then dismissing classifications. Finally, RF did not load onto the AAI factor that has been shown to differentiate secure from dismissing individuals, but rather loaded onto the factor that reflects preoccupied and unresolved states-of-mind.

Broadly speaking, these results might be explained by any or all of the following possibilities: (1) the Reflective Functioning Scale was not applied adequately by the coders (i.e., experimental error), (2) unexpected results are due to sample characteristics within the MLSRA (i.e., RF has problematic construct validity within high-risk samples), and/or (3) lack of expected correlations signify issues with the overall construct (i.e., the construct of RF does not function as theorized within the attachment framework). I explore each of these possibilities in the following discussion while further

interpreting study results, before noting strengths and limitations of this dissertation project and avenues for future research.

Application of the Reflective Functioning Scale

One possible explanation for the lack of associations with hypothesized attachment measures is improper coding of RF within this sample. The two graduate-student coders in this study were trained directly by Howard Steele, one of the developers of the Reflective Functioning Scale. Each coder independently achieved reliability (*ICC* ≥ .80 using a training set of 15 interviews) prior to coding RF in the current sample. Additionally, interrater reliability in the current study was good (*ICC* = .82). Thus, it seems unlikely that the results can be explained by poor application of the Reflective Functioning Scale.

However, average RF scores in the MLSRA sample (*M* = 2.89, *SD* = 1.65, range = .5 to 7.5) are relatively lower compared to scores from both normative and high-risk samples reported in the literature. According to the literature, RF scores tend to be lower in high-risk samples. In one of the original validation studies of the Reflective Functioning Scale (Fonagy et al., 1998), non-psychotic psychiatric inpatients had lower levels of RF (*M* = 3.7, *SD* = 1.8) than healthy controls (*M* = 5.2, *SD* = 1.5). In a similar study comparing 46 psychiatric inpatients with major depressive disorder to 20 healthy controls, RF ratings for the two groups were *M* = 2.4 (*SD* = 1.5) and *M* = 4.1 (*SD* = .90), respectfully (Fischer-Kern et al., 2013). More recently, Jessee and colleagues (2016) found average RF scores of 4.36 (*SD* = 1.45, range = 1 to 8) in a sample of normative-risk first-time parents, indicative of moderate RF.

Yet, there appears to be a significant range of RF scores in both types of samples, and high-risk samples do not always possess lower RF scores. For example, in a sample of pregnant mothers with histories of childhood maltreatment, *M* = 4.14, *SD* = 1.95 (Ensink, Berthelot, Bernazzani, Normandin, & Fonagy, 2014), comparable to the

control and normative-risk samples reported above. In contrast, a sample of middle-aged Italian mothers of middle-schoolers showed slightly lower levels of RF: *M* = 3.71, *SD* = 1.6, range = -1 to 7 (Rosso et al., 2015).

Given higher levels of maltreatment and mental health symptoms in the MLSRA sample (e.g., Martin, Raby, Labella, & Roisman, 2017), it was expected that average RF scores would fall somewhere between those found in normative-risk and clinical samples. The fact that the average RF score in the MLSRA sample was quite low was unexpected and might reflect deflated RF scores. This could be explored by having a separate reliable RF coder (blind to all study variables and hypotheses) code a subset of AAIs to determine whether the Reflective Functioning Scale was applied adequately in this study (as determined by interrater reliability between the new coder and the primary graduate student coder, who independently coded all AAIs).

Sociodemographic Predictors of RF

Although not part of the primary analyses of this study, it is worth acknowledging significant correlations found between RF and sociodemographic covariates. This study found significant differences in RF scores between females and males. The current literature on gender differences in RF is inconsistent; although many studies do not find significant gender differences (e.g., Arnott & Meins, 2007; Taubner & Curth, 2013), others do find significant differences such that females are significantly higher on RF than men (e.g., Bouchard et al., 2008; Jessee et al., 2016). Jessee and colleagues (2016) suggest that interviews might capture men's lower *motivation* to consider mental states rather than their *ability*, given that women tend to be more emotionally expressive than men. This study adds to the inconsistent nature of the RF literature, highlighting the need to further understand gender differences in RF.

Results also indicated a weak, yet significant association between RF and SES across childhood, even when controlling for other covariates and measures of the early

caregiver-child relationship. There is limited literature on links between socioeconomic factors and general adult RF. The original validation study of the Reflective Functioning Scale found no significant correlation between RF score and SES (Fonagy et al., 1998). In the parental RF literature, some studies suggest an association between family sociodemographic risk. For example, when Ensink and colleagues (2015) used a control group that was sociodemographically matched with a group of mothers who had experienced childhood abuse, they found that the mean level of parent RF in the control group was lower than expected in middle class samples. Family adversity (sum score of variables related to financial strain, single parenthood, maternal depressive symptoms, maternal education, and housing) is weakly, yet significantly correlated with maternal mind-mindedness, a correlate of RF under the mentalization umbrella (Hughes, Aldercotte, & Foley, 2017). It is not unreasonable to predict that RF would be positively correlated with SES. Financial strain tends to increase family distress, consistent with the Family Stress Model (Conger, Rueter, & Conger, 2000). Increased distress likely undermines an individual's self-regulation skills and thus inhibits their ability and tendency to understand the mental states of the self and others. It is also possible that lower RF might be associated with a cascade of behaviors that leads to increased sociodemographic risk, consistent with the idea of social causation versus social selection (Conger, Conger, & Martin, 2010). More research on the links between SES and RF are needed to understand this relation.

Caregiver-Child Relationship as a Predictor of RF

Both psychoanalytic and attachment theory posit that infant attachment security should predict RF. However, the current study found no such association within a prospective, longitudinal sample. This finding is surprisingly consistent with a recent follow-up from the London Parent-Child Project (H. Steele et al., 2016), the only other study prospectively examining antecedents of RF.

Other follow-up studies from the London Parent-Child Project suggest mixed influences of mothers' and children's attachment security and representations on mentalization over time. Infant-mother attachment security at 12 months—but not infant-father attachment at 18 months, nor parent prenatal AAI security—uniquely predicted children's mixed-emotion understanding at age 6 (H. Steele et al., 1999). Conversely, maternal prenatal AAI security—but not paternal prenatal AAI security, nor infant-mother or infant-father attachment security—significantly predicted performance on a narrative measure of social cognition at age 11 years (M. Steele et al., 2002). Researchers also found that infant-mother attachment security explained 16% and 6% variance in emotion recognition accuracy on a facial expression labelling task administered at ages 6 and 11 years, respectively (H. Steele et al., 2008). Parents' prenatal AAI security did not significantly predict performance at either time point.

The authors reasoned that the insignificant association between infant attachment security and middle childhood social cognition at age 11 provided support for the "'ongoing maternal influence' hypothesis" rather than the "'early experience matters most' hypothesis" (M. Steele et al., 2002, p. 869). In other words, the infant-mother relationship likely fosters a child's initial organization of self and other that is updated by other social learning over time, some of which comes from the ongoing maternal-child relationship (H. Steele et al., 2008). Given the longitudinal research results from the London Parent-Child Project by Steele and colleagues, as well as results from the MLSRA in the current dissertation project, it seems likely that the infant's initial internal working model (i.e., infant attachment security) has decreasing impact on their reflective/mentalizing abilities over time.

However, it is currently unclear whether *updated* internal working models (i.e., measures of childhood attachment representational models) continue to have impacts on adolescent and adult RF and other measures of mentalization over time, and if so,

whether those associations approach zero or some other non-zero value over time. In developmental psychology, these reflect revisionist and enduring models, respectively (Fraley, Roisman, & Haltigan, 2013). Some preliminary evidence suggests that parents' influence on RF is at best moderate by middle childhood (Ensink et al., 2015). Ideally, these questions could be tested by using a very large, prospective, sociodemographically-diverse longitudinal sample with measures of the internal working model/attachment representations and mentalization (i.e., RF, social cognition) over time, from infancy into adulthood. Autoregressive models could further elucidate the strength of the associations between early attachment and RF over time, as well as moderators of those associations (Fraley et al., 2013).

The "ongoing maternal influence hypothesis" (M. Steele et al., 2002, p. 869) suggests that maternal behaviors—such as sensitivity—might be stronger predictors of RF over time compared to infant attachment security. However, in the current study, results indicated that when controlling for infant attachment security and covariates, maternal sensitivity from ages 3 months to 13 years was *negatively* associated with RF. This negative association could be partially or entirely explained by experimental error in that coders in the current study might have confounded preoccupied states of mind (e.g., lengthy narratives discussing complex family dynamics using current, intense negative emotion) with reflection. This possibility is discussed further in a later section of this discussion. If RF scores were indeed confounded with preoccupied states-of-mind, the association between maternal sensitivity and RF would need to be re-evaluated after controlling for state-of-mind scales related to preoccupation (e.g., maternal and paternal anger).

This study used a composite of seven measures of maternal sensitivity across childhood. Although this composite significantly predicted other adult outcomes in the MLSRA sample (e.g., electrodermal reactivity during conflict discussions with romantic

partners in adulthood, Raby et al., 2015; adult attachment representations, T. E. A. Waters et al., 2017), it might be that RF is only positively correlated with later measures of sensitivity (e.g., age 13). It would be interesting to explore whether the individual measures of maternal sensitivity—perhaps divided by developmental period—differentially predict adult RF.

Alternatively, sensitivity might not be the most relevant parenting behavior to examine as an antecedent of RF. A number of other parenting behaviors might be more closely related to RF and mentalization, including a parent's ability to openly respond to and discuss negative emotions, emotional validation, emotion coaching, and engagement in pretend play (M. Steele et al., 2002). Many of these parenting behaviors seem to fall under the category of emotion socialization, which sensitive parents are also thought to engage in (Eisenberg, Cumberland, & Spinrad, 1998). Nonetheless, direct measures of parental emotion socialization across childhood might better predict adult RF than sensitivity.

Outside of the attachment framework, other plausible predictors of adult RF might include verbal ability (Ensink, 2003; Håkansson et al., 2017) and depressive symptoms (Håkansson et al., 2017; Krink et al., 2018; Suchman et al., 2010). These variables are available in the MLSRA dataset and might be reasonable antecedents to explore.

Associations between RF and Adult Attachment

Construct Validity

One of the primary markers of construct validity for RF is its established association with adult attachment security and coherence of transcript/mind as measured by the AAI. The original RF validation study from the London Parent-Child Project showed that secure mothers and fathers had higher levels of RF compared to insecure parents (Fonagy et al., 1991). Similar results were found in original validation

study for parental RF (Slade et al., 2005). The original study from Fonagy and colleagues (1991) also demonstrated strong correlations with coherence of transcript (r = .73 in mothers, r = .64 in fathers). Subsequent studies have demonstrated moderate correlations with coherence of mind/transcript (Fonagy et al., 1991; Jessee et al., 2016; Levy et al., 2006; Riva Crugnola, Ierardi, & Canevini, 2018; Rosso & Airaldi, 2016), potentially due to the absence of coder cross-training on both the Reflective Functioning Scale and the Main and Goldwyn state-of-mind coding systems in the latter studies (Jessee et al., 2016).

In the current study, RF scores were not significantly associated with adult attachment security (two-way classification, insecure versus secure) nor coherence of mind. Other areas of inconsistency between the current study and the literature-at-large is the tendency to find insignificant to weak negative correlations with anger and passivity (Fonagy et al., 1991; Jessee et al., 2016; Riva Crugnola et al., 2018; Rosso et al., 2016). In the current study, RF was moderately positively correlated with these scales. Additionally, other studies demonstrate mixed correlations with unresolved loss, from insignificant positive correlations (Jessee et al., 2016) to moderately negative (Riva Crugnola et al., 2018) correlations. In the current study, RF was moderately positively correlated with unresolved loss.

Despite many differences, a number of associations between RF and state-of-mind scales found in this study are congruent with the other studies. RF is consistently found to show weak to moderate negative correlations with idealization, derogration, and lack of recall (Fonagy et al., 1991; Jessee et al., 2016; Riva Crugnola et al., 2018; Rosso et al., 2016), consistent with the current study. RF also showed a moderate positive correlation with metacognitive monitoring, consistent with other studies (Jessee et al., 2016). This is particularly important to note because the Reflective Functioning Scale

largely originated from and expanded on the metacognitive monitoring scale (Steele & Steele, 2008).

Given the inconsistency in expected correlations between RF and AAI state-of-mind scale scores, the construct validity of RF in the current study is questionable. It is difficult to understand why this is. The MLSRA uses a high-risk sample of adults born into poverty, so it is sensible to consider the potential intersections between construct validity and sample sociodemographic risk levels. In other words, perhaps RF operates differently within populations of different sociodemographic risk. However, the current literature does not necessarily support this. Most of the studies listed above use normative-risk samples (Fonagy et al., 1991; Jessee et al., 2016; Rosso et al., 2016), although not all (Levy et al., 2006; Riva Crugnola et al., 2018). A study by Riva Crugnola and colleagues (2018) is particularly insightful. In this study, researchers recruited two Italian community samples: one including adult mother-infant dyads and the other including adolescent mother-infant dyads. Although the adolescent mother group had lower SES and lower mean levels of RF compared to the adult mother group, both groups had comparable correlations between RF and AAI state-of-mind scale scores, including significant positive correlations with coherence of mind (Riva Crugnola et al., 2018). However, as noted previously, there is limited literature on associations between sociodemographic risk and general adult RF. Thus, studies looking at general RF should continue to use diverse samples. If the literature becomes large enough, meta-analyses could calculate whether correlations between RF and markers of attachment security differ as a function of sociodemographic risk.

The Complex Association between RF and Preoccupation

In the current study, not only were RF scores not associated with AAI security and coherence of mind, but they were unexpectedly positively correlated with markers of preoccupied and unresolved states-of-mind. In retrospect, this is not entirely surprising.

According to the RF Manual, “if a subject acknowledges a particularly difficult situation, with the thoughts or feelings appropriate to that, then credit is given for the subject’s willingness to accept experiences rather than defend against them, avoid rationalising the behaviour of people who hurt him or her, etc.” (Fonagy et al., 1998, p. 39). Further, the manual states that:

> If the rater sees the part of the narrative as particularly emotionally charged and difficult for the subject then showing even marked levels of mental state understanding may be considered “exceptional”. Examples might include the understanding of rejection, neglect or abuse by the caregiver in childhood, or understanding feelings of current anger or resentment from or toward the attachment figure. (Fonagy et al., 1998, p. 40)

In other words, an interview is indicative of marked or exceptional RF (score of at least 7) if the participant makes seemingly reasonable links between mental states and behaviors within their self and between individuals, *especially* in contexts of loss, trauma, or other difficult circumstances. The more they do so, the higher RF score they will receive.

It was not uncommon to encounter interviews where participants spoke in detail about their retrospective perspective on experiences of loss and trauma, particularly experiences of maltreatment. Below is an excerpt from the AAI of an individual who received a relatively high overall RF score (7.0), but was classified as preoccupied (with applicable phrases underlined):

> at one point, I went to live with my dad and-- I was probably- I must have been twelve…and the reason was because my mom and I had gotten into a big fight and she basically said, you know, “I don’t want you. Get out. Go with your dad.” and I got off the plane and we were down in baggage claim and they were- my dad and Person 2 were really happy to see me- to have me, you know, they were

> just very giddy and “Oh, da da da.” and I remember. I was just standing there and I must have looked like a zombie ‘cause my dad said, you know, “Honey, are you okay?” and I just said, “No.” I said, “I don’t know if I’m happy to be here ‘cause I’m not here because it was a choice.” and I’m sure that can be a very hurtful thing for a parent to hear, but my dad was very- very comforting and said, you know, “It’s gonna be okay and you and your mom will work things out.” and just sat there and held me, so-- yeah, it was weird.

In this excerpt, the individual recognized (a) how her father’s perception of her appearance and demeanor impacted his reaction as she arrived at the airport (4.2.6 – “Taking into account how others perceive one”), (b) how factors outside of the present situation (i.e., her fight with her mother) impacted her emotional state (4.2.2 – “Envisioning the possibility that feelings concerning a situation may be unrelated to observable aspects of it”), and (c) how her reaction must have understandably negatively impacted her father (4.1.4 – “Mental states tied to expressions of appropriate normative judgements”), all indicators of RF.

In contrast, below are excerpts from the AAI of an individual who received a low overall RF score (1.0), but was classified as secure. When the participant was asked to elaborate why she described her relationship with her mother as somewhat difficult, she explained:

> When I was eight, she started going back to school and um- and she worked, so I never got to see her. I lived at my grandma’s, so that was difficult because my grandma was doing her own thing, but yet I was over there, and then my mom was gone all the time and my uncle lived with my grandma who was an alcoholic. It was a difficult situation.

When asked whether she had ever felt rejected during her childhood, she responded:

> I called my mom and she came home and it was probably one of my uncles because I had somebody of a different race in the house- one of my really good friends and she came over and he just started going off and yelling and nagging and telling me to get my friend out of the house and- um- I felt really rejected ‘cause I’m like, you’re showing prejudice ‘cause my mom’s whole family is white and my dad’s whole family is all Mexican, so I felt rejected because I’m not white either and he made a big issue out of it and I felt rejected and ever since then I haven’t spoke with him.

In both of these excerpts, the participant answers the interviewer’s questions adequately, is coherent, and provides evidence for her claims. However, her interview was very concrete and descriptive rather than reflective, hence her low score on the Reflective Functioning Scale.

It is worth considering that many of the individuals classified as preoccupied should not have received as high of an RF score as they did. Although not explicitly included in the Reflective Functioning Scale Manual (Fonagy et al., 1998), the two graduate student coders in this study were told at the in-person Reflective Functioning Scale training to pay attention to past versus present tense, such that it is acceptable to describe being angry in the past from a present, calm perspective, but describing anger in the present tense “means something very different” (H. Steele, personal communication, January 24, 2019). Indeed, the maternal and paternal anger state-of-mind scales are indicative of preoccupied classifications (Roisman et al., 2007; Haltigan et al., 2014). Given moderate positive correlations between RF and anger scales found in the current study, it is plausible that the coders misinterpreted current anger and unresolved loss/abuse as high RF and assigned too much credit to these interviews, thus confounding in-depth explanations of anger and unresolved processing with RF.

However, it is also worth considering that there exists a complex relationship between preoccupation and RF. In a follow-up study from the London Parent-Child Project, H. Steele and colleagues (2016) showed that the adolescent children of mothers prenatally classified as preoccupied had RF scores that did not significantly differ from those belonging to adolescent children of mothers with secure or dismissing classifications. Researchers noted that “the conversational style of the preoccupied speaker is one that may or may not engender reflective functioning, depending on what the listener does with the complaints and ruminations likely to be expressed by the preoccupied speaker” (H. Steele et al., 2016, p. 311).

Other studies of adult attachment provide clearer links between preoccupied states of mind and higher levels of mentalization. One study demonstrated that college students with higher levels of anxious attachment (as measured by Attachment Style Questionnaire) reported higher ability to identify, label, and analyze emotions, and demonstrated higher levels of self and other emotional awareness as captured by a projective vignette paradigm (Fantini-Hauwel, Boudoukha, & Arciszewski, 2012). Authors suggested that higher levels of distress and dependence on close relationships in individuals with preoccupied attachments actually facilitate emotional awareness of self and others (Fantini-Hauwel et al., 2012).

Buchheim and Mergenthaler (2000) analyzed AAI transcripts in a small, normative-risk German sample using a computer-based text analysis to identify emotion-abstraction patterns. Emotion-abstraction patterns delineate cycles between an emotional tone (i.e., “linguistic manifestation of the emotional event) and abstraction (i.e., “linguistic manifestation of cognitive-reflective processes” about the emotional event; Buchheim & Mergenthaler, 2000, p. 393). Specific patterns are based on the relative amounts of emotional tone and abstraction identified in a transcript, with the “connecting” pattern (high emotion and high abstraction) considered to be most beneficial for

productive reflection and therapeutic success (Buchheim & Mergenthaler, 2000). Results indicated that compared to adults with a secure or dismissing classification, adults with a preoccupied classification demonstrated the highest levels of overall emotional tone (primarily negatively-valenced), highest levels of abstraction, and highest levels of the "connecting" pattern. Yet, paradoxically, within the preoccupied group, AAI coherence showed a moderately negative correlation with level of "connecting" pattern and a moderate positive correlation with level of "experiencing" pattern (i.e., "topics with intensively experienced positive or negative meaning are brought up and emotionally verbalized without the person expressing him- or herself in an abstract, insightful way"; Buchheim & Mergenthaler, 2000, p. 393). In their discussion, Buchheim and Mergenthaler (2000) compared high levels of emotional tone and cognitive abstraction (i.e., the "connecting" pattern) to "a drug which, similar to an antibiotic, is especially needed during an acute illness, but which, after recovery, is needed only in smaller doses (when it would be comparable with the auto-immune function after stopping antibiotics)" (p. 402). Following this rationale, perhaps higher levels of RF within the context of the AAI can be indicative of hypermentalization that is maladaptive rather than adaptive, leading to rumination and psychopathology (Ensink, 2003; Ensink & Mayes, 2010).

The literature on parental mentalization mirrors the complexity between preoccupation and mentalization found in the adult mentalization literature. In particular, mind-mindedness—a construct under the umbrella of mentalization—has been both positively (Demers, Bernier, Tarabulsy, & Provost, 2010) and negatively (Bernier & Dozier, 2003) correlated with measures of adult and infant attachment. In a study by Milligan and colleagues (2015), mothers with preoccupied attachments used the highest level of both positive and negative emotion words during a projective measure where they were asked to imagine that they were talking to their 6-month-old infant.

Additionally, total mind-mindedness was positively correlated with states of mind regarding anger and negatively correlated with coherence of mind (Milligan, Khoury, Benoit, & Atkinson, 2015), similar to the current study.

Overall, the literature conveys a complex association between preoccupation and mentalization that is mirrored in the current study. The context in which mentalizing comments are made (i.e., in an interview while discussing traumatic histories versus during free-play with a young infant) is likely incredibly important to interpret their meaning and associations with other attachment measures (e.g., attachment security, states-of-mind, parenting behaviors).

Types of RF

As the literature expands, researchers have identified various subtypes of RF that are differentially associated with outcomes of interest. The following section highlights additional methods of classifying RF that might shed more light on the associations between the antecedents and concurrent correlates of RF examined in this dissertation project.

The parental mentalization literature suggests that the *accuracy* or *appropriateness* of mentalization is most predictive of secure adult and infant attachment. In observational measures of parental mind-mindedness, observers are able to judge whether parents' comments are (a) consistent with observed infant behavior (appropriate/accurate) or (b) inaccurate in their reading of their infant's mental states (non-attuned). Meins and colleagues (2012) demonstrated that mothers' appropriate and non-attuned mind-related comments separately predict their infants attachment security classification. Sharp and colleagues (Sharp, Fonagy, & Goodyer, 2006) demonstrated that maternal accuracy in guessing their child's response to social scenarios (i.e., accurate thinking about their child's thinking) predicted child psychosocial adjustment

and attributional response style, enforcing the idea that accuracy of mentalizing rather than raw amount of mentalization might be important for psychological outcomes.

When coding the AAI for RF, it can be challenging to ascertain whether participants' comments about their caregiving history are truly accurate or not without more knowledge of the participant's life history. Anecdotally, this was a common issue while coding RF in the current study. The Reflective Functioning Scale specifically requests that individuals be marked down for distorting or self-serving RF (e.g., "over-estimating the extent to which the self may have been the cause of the behaviours of others," Fonagy et al., 1998, p. 31). However, in contexts of maltreatment, it was impossible to know whether some participants' comments were distorted and self-serving or quite accurate representations of a dysfunctional relationship. For example, one participant—whose biological father was a drug addict and stepfather was verbally abusive—said "I think a lot of times having me gave [my mother] the strength or the motivation to do the things that she was trying to do." This statement may very well reflect genuine transactional processes between mother and son, but at face value, it could also represent an over-emphasis on the impact he had on his mother. As such, it is very difficult to assess the accuracy or appropriateness of reflective statements within the AAI without a more intimate knowledge of an individual's lived experiences. This might be remedied by controlling for actual lived experiences (e.g., maltreatment) or the Main and Goldwyn "inferred experience" scales.

The parenting mentalization literature also suggests that the valence of reflecting statements might be important. For example, positive and negative mental state talk is differentially associated with aspects of parenting and child outcomes in the mind-mindedness literature (McMahon & Bernier, 2017). Rosso and colleagues (2015) found that mothers' frequency of positive, negative, and mixed-ambivalent mental states in the AAI were differentially correlated with global RF score and state-of-mind subscale

scores, and was sometimes more strongly correlated with aspects of their child's mentalization. As such, raw frequencies or relative ratios of positively- and negatively-valenced statements in the AAI might be helpful to evaluate, especially considering that adults use different frequencies of valenced mental state talk based on attachment security classification (Buchheim & Mergenthaler, 2000).

Finally, the Reflective Functioning Scale requires coders to flag interviews for four different markers of RF: "Awareness of the nature of mental states," "Explicit effort to tease out mental states' underlying behavior," "Recognizing developmental aspects of mental states," and "Mental states in relation to the interviewer." In addition to breaking down RF scores into valenced mental state talk, Rosso and colleagues (2015) also broke down RF into frequency counts of the four markers listed above. Individual markers were also differentially related to state-of-mind subscale scores and child mentalization. This type of analysis would be intriguing in the current study, although a priori hypotheses would need to be made as to whether one would expect individual markers of RF to be differentially correlated with study variables.

The Significance of RF within the Broader Attachment Framework

Barring any issues with the RF coding as discussed above, the current study suggests that RF does not function as theorized within the attachment framework, at least not always. However, this does not mean that RF is not a helpful construct to study within the context of other psychological outcomes. For example, adult general RF has been shown to be a moderator and mediator of psychotherapy treatment success (see Katznelson, 2014 for a review). Additionally, studies repeatedly demonstrate the role of parental RF in fostering sensitive parenting and positive child outcomes (see Camoirano, 2017 for a review). Even though adult general RF was not predicted by infant attachment security and maternal sensitivity as hypothesized in the current study, adult RF (either general or parental) might still be helpful for the development of sensitive parenting in

the next generation. Not everyone is convinced of the value of parental mentalization as a mediator of the intergenerational transmission of attachment (van IJzendoorn & Bakermans-Kranenburg, 2019), but meta-analytic work is only budding (Zeegers, Colonnesi, Stams, & Meins, 2017). More work is needed to determine the role of RF within the entire attachment framework—across various populations, within different contexts, and intergenerationally.

Strengths and Limitations

There are a number of notable strengths in this dissertation project. First and foremost, it was primed to answer questions regarding antecedents of RF by using a prospective, longitudinal dataset with relatively low rates of attrition across several decades. Second, many constructs were assessed using widely-recognized "gold-standard" measures; infant attachment security was measured using the SSP, adult attachment security was measured using the AAI, and RF was measured using the Reflective Functioning Scale as applied to the AAI. Additionally, maternal sensitivity was measured observationally, which reduces bias introduced by self-report questionnaires. Third, the graduate student coders were directly trained by one of the original developers of the Reflective Functioning Scale, and were not trained on any other AAI coding schemes.

The dissertation project also had a number of limitations. Unfortunately, given the lack of correlation between RF scores and AAI coherence, as well as the relatively low mean RF scores within the sample, it is not clear whether the Reflective Functioning Scale was implemented correctly. Experimental error is inevitable in any study, but without knowing with more certainty that RF was coded properly, the results of this project must be interpreted with caution. Additionally, even though regression analyses purposefully focused on attachment-related predictors of RF and the key covariates typically included in MLSRA studies, it might have been favorable to include other

covariates that were more proximate, such as verbal ability (e.g., verbal IQ, academic achievement tests), education level, and current SES.

Future Directions

The results from this dissertation project have sparked many avenues for further exploration in our understanding of the construct of RF and its role in the attachment framework. This study is only the second to use a longitudinal dataset of participants whose mothers were recruited during pregnancy to analyze antecedents of RF. It is the first to do so into adulthood, as well as within a high-risk sample. This is both a strength and limitation of this project's contributions to the RF literature in that it is novel, yet irresponsible to draw conclusions from. Results found in the two existing studies must be replicated in other longitudinal datasets. The NICHD Study of Early Child Care and Youth Development (SECCYD) would be an excellent candidate. The SECCYD is a prospective, longitudinal study that recruited families from birth and regularly measured child functioning over time (including into adulthood) to understand the impact of contexts of care on developmental outcomes. Researchers have already used the SECCYD to explore antecedents of SBSK at age 18 (*n* = 673, R. D. Steele et al., 2014). Researchers could also code AAIs to explore antecedents of RF in the same dataset at age 18 or later.

The results imply that we have limited knowledge of what predicts adult RF. As such, more research is needed to understand what *does* significantly predict RF and contribute to its development. Possible areas of exploration include verbal ability, education level, earlier markers of social cognition (such as theory of mind, emotion understanding), and different aspects of parenting (including observed emotion socialization behaviors).

A growing body of research suggests that more nuanced analyses of RF are helpful in understanding its associations with related constructs. For example, the

accuracy and appropriateness of mentalizing statements might be more relevant than raw quantity or perceived quality of statements. This is admittedly difficult to measure in the AAI, a retrospective account of lived experiences from childhood. In prospective, longitudinal datasets, perhaps analyses could control for variables that might help to contextualize participants' experiences (e.g., maltreatment, life stress, instability, inferred experience scales). Alternatively, researchers could develop more on-line, behavioral or projective narrative measures of adult RF in which participants can continue to discuss themes of attachment (e.g., reading stories about family relationships), but experimenters can more readily assess accuracy in mentalizing statements. Other ways of refining RF analyses would be to examine ratios of positively- and negatively-valenced reflective statements, as well as dividing scores into the four different markers of RF according to the Reflective Functioning Scale. Each of these paths are exploratory, but might refine our understanding of the role of RF.

Finally, this dissertation project was largely inspired by the opportunity to explore the antecedents of a construct that has been increasingly targeted by parenting interventions and psychotherapies. Most of the existing interventions tend to target parental RF rather than general RF. Surprisingly, very few studies have empirically studied correlations between these two constructs, either concurrently or longitudinally, even though they are hypothesized to be closely related. General and parental RF might have different correlations with childhood measures (e.g., infant attachment security, sensitivity), adult functioning (e.g., parenting behaviors, romantic functioning), and children's functioning (e.g., socio-emotional development, psychopathology). Additional research is needed to examine associations and differences between general and parental RF, especially in longitudinal samples (i.e., before and after the transition to parenthood).

Conclusion

This dissertation project aimed to contribute to the literature surrounding a construct that has received increasing attention in recent years and is the target of many parenting interventions. To understand the information gleaned from this project, it seems sensible to return to some of the initial questions posed regarding the role of RF within the attachment framework.

The construct of RF originated from the attachment and psychoanalytic literatures to further explain the intergenerational transmission of attachment as an alternative mediator between adult attachment and infant attachment. This dissertation project did not explore this connection, but existing research suggests that might still serve this purpose, at least to some extent. Whether it does so uniquely—above and beyond other constructs such as sensitivity—has yet to be firmly established.

Instead, this dissertation project explored RF as an attachment-related construct that was hypothesized to be (a) influenced by one's early attachment experiences and (b) perhaps more closely associated with early attachment experiences and concurrent adult attachment than other burgeoning constructs, namely SBSK. Results suggest that neither of these statements are true.

Though it is possible that the null results presented here reflect a reality in which the RF does not function within the attachment framework as originally theorized, this does not preclude the utility of the construct as a predictor of other important adult and child outcomes. Ongoing work is needed before the field can determine whether RF really is "old wine in new bottle."

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Table 1

Descriptive Statistics for Study Variables

	n	*M*	*SD*	Range
Covariates				
Sex[a]	164	1.49	—	1 – 2
Race/ethnicity[a]	164	.68	—	0 – 1
Mat. education	164	12.43	1.69	8 – 18
TSEI	164	23.58	10.38	10.0 – 70.9
Child at age 26[a]	164	.52	—	0 – 1
Caregiver–child relationship				
Prop. times secure	161	.55	.41	0.0 – 1.0
Mat. sensitivity	164	.06	.61	–1.75 – 1.4
Adult attachment				
AAI State-of-mind				
Mat. idealization	162	3.51	2.02	1 – 9
Pat. idealization	144	2.62	1.81	1 – 8
Mat. anger	163	1.77	1.46	1 – 9
Pat. anger	144	1.81	1.51	1 – 7
Derogation	164	2.29	1.83	1 – 9
Lack of recall	163	3.09	2.17	1 – 9
Metacognitive monitoring	164	1.30	.71	1 – 5
Passivity	164	3.09	1.54	1 – 8
Fear of loss	163	1.35	0.93	1 – 5
Unresolved loss	163	3.39	2.09	1 – 9
Unresolved abuse	152	2.12	1.89	1 – 8
Coherence of mind	164	4.44	1.86	1 – 9
AAI Security[a]	163	1.45	—	1 – 2
SBSK	162	3.25	1.22	1.0 – 6.5
RF	164	2.89	1.65	.50 – 7.5

Note. Mat = maternal. Pat = paternal. TSEI = total socioeconomic index. Prop. times secure = proportion of times secure in infancy. AAI = Adult Attachment Interview.
[a]Variable is binary. For sex, male = 1, female = 2. For race/ethnicity, non-White = 0, White = 1. For child at age 26, no = 0, yes = 1. For security, insecure = 1, secure = 2.

Table 2

Bivariate Correlations for Major Study Variables

	1	2	3	4	5	6	7	8	9	10
1. Sex[a]	—									
2. Race/ethnicity[a]	.07	—								
3. Mat. education	-.15*	-.11	—							
4. SES	-.03	.04	.53***	—						
5. Child at age 26[a]	.09	-.18*	-.14†	-.09	—					
6. Prop. times secure	.08	.05	.26***	.21**	-.12	—				
7. Mat. sensitivity	-.04	.26***	.50***	.33***	-.20*	.30***	—			
8. AAI coherence	.04	.13	.12	.12	-.17*	.19*	.18*	—		
9. AAI security	.13	.12	.08	.13	-.12	.18*	.19*	.86***	—	
10. SBSK	.02	.27***	.14†	.16*	-.07	.09	.37***	.29***	.33***	—
11. RF	.34***	-.10	.07	.20*	-.08	.07	-.11	.07	.12	-.18*

Note. Mat = maternal. SES = socioeconomic status. Prop. times secure = proportion of times secure in infancy. AAI = Adult Attachment Interview. SBSK = secure base script knowledge. RF = reflective functioning.

[a]Variable is binary. For sex, male = 1, female = 2. For race/ethnicity, non-White = 0, White = 1. For raising child at 26 years, no = 0, yes = 1.

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 3

Regression Analysis Summary for Predictors of Reflective Functioning

	Step 1			Step 2		
	B	*SE*	β	*B*	*SE*	β
Sex[a]	1.16***	.24	.35	1.21***	.24	.36
Race/ethnicity[a]	-.46[†]	.26	-.13	-.18	.27	-.05
Mat. education	.00	.08	.00	.09	.09	.09
SES	.03*	.01	.21	.04**	.01	.23
Prop. times secure	—	—	—	.12	.31	.03
Mat. sensitivity	—	—	—	-.56*	.24	-.21
R^2		.17			.21	
AIC		609.90			597.69	

Note. Mat = maternal. SES = socioeconomic status. Prop. times secure = proportion of times secure in infancy.

[a]Variable is binary. For sex, male = 1, female = 2. For race/ethnicity, non-White = 0, White = 1.

[†]$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 4

Bivariate Correlations for Adult Attachment Interview Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Mat. Idealization	—												
2. Pat. Idealization	.51***	—											
3. Mat. Anger	-.31***	-.13	—										
4. Pat. Anger	-.18*	-.27**	.32***	—									
5. Derogation	.06	-.23**	.32***	.36***	—								
6. Lack of recall	.60***	.28***	-.22**	-.23**	.10	—							
7. Metacogn. mon.	-.15†	-.08	.08	.10	-.02	-.28***	—						
8. Passivity	-.28***	-.26**	.43***	.36***	.24**	-.26***	.10	—					
9. Fear of loss	.04	.09	.09	-.08	.03	.03	.00	-.01	—				
10. Unresolved loss	-.11	-.07	.37***	.17*	.33***	-.09	.08	.41***	.23**	—			
11. Unresolved abuse	-.09	-.08	.44***	.29***	.23**	-.08	.06	.39***	.13	.31***	—		
12. Coherence of mind	-.47***	-.33***	-.24**	-.21*	-.39***	-.44***	.13†	-.27**	-.06	-.22**	-.37***	—	
13. SBSK	.08	.08	-.40***	-.30***	-.26***	.00	.05	-.20*	-.03	-.24**	-.34***	.29***	—
14. RF	-.45***	-.32***	.50***	.42***	.12	-.42***	.43***	.45***	.04	.34***	.29***	.07	-.18*

Note. Mat = maternal. Pat = paternal. Metacog. mon. = Metacognitive monitoring. SBSK = secure base script knowledge. RF = reflective functioning.

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 5

EFA Results for Adult Attachment Representation Variables

	Model 1		Model 2		Model 3		Model 4	
	Factor I	Factor II	Factor I	Factor II	Factor I	Factor II	Factor I	Factor II
Variable Loadings								
Coherence of mind	**–.80**	–.49	**–.76**	–.53	**–.96**		**–.92**	
Mat. Idealization	**.77**	–.30	**.80**		**.58**	–.53	**.64**	–.47
Lack of recall	**.68**		**.69**		**.53**	–.46	**.58**	–.39
Pat. Idealization	**.54**		**.55**		.39	**–.40**	**.43**	–.36
Passivity		**.70**		**.67**		**.69**		**.69**
Mat. Anger		**.66**		**.67**		**.68**		**.70**
Unresolved abuse		**.59**		**.61**	.31	**.51**		**.55**
Pat. Anger		**.53**		**.53**		**.54**		**.56**
Unresolved loss		**.49**		**.49**		**.47**		**.49**
Derogation		**.48**		**.50**	**.37**	.36	.33	**.40**
SBSK	—	—		**–.48**	—	—		**–.42**
RF	—	—	—	—		.71		**.68**
Variance explained	.21	.25	.19	.24	.19	.27	.18	.26
Fit indices								
Chi-square	72.53***		84.33***		85.75***		99.45***	
TLI	.84		.85		.86		.86	
RMSEA	.10		.09		.10		.09	
Interfactor correlation	.03		.03		–.03		–.03	

Note. Mat = maternal. Pat = paternal. EFAs were performed using maximum likelihood estimation with oblique rotation (direct oblimin). Only factor loadings greater than .30 are shown. Values in bold are the factors on which each scale loaded most strongly.

***$p < .001$

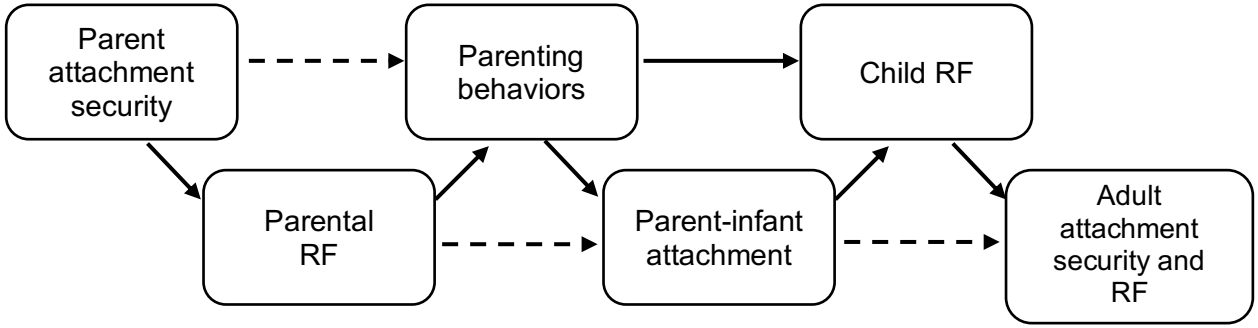

Figure 1. Overarching model of the role of RF in the intergenerational transmission of attachment. Solid lines indicate direct effects; dashed lines indicate indirect effects.